Transboundary Air Quality Governance: A Case Study Of The Paso Del Norte Air Basin 1940-2000

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TRANSBOUNDARY AIR QUALITY GOVERNANCE: A CASE STUDY OF
THE PASO DEL NORTE AIR BASIN
1940-2000

LAURA MARGARITA URIBARRI
Doctoral Program in Borderlands History

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Dedication

This dissertation is dedicated to my village – to all of those beloved family members, friends, mentors and guides who enabled, supported, and encouraged me throughout this journey. A mi mama y papa por su apoyo y amor sin limite. To Raul, my life partner and soul mate, for your patience, endurance and love. A mis pequeños fronterizos, Emiliano and Elias, for giving me the gift of laughter, discovery and purpose. I love you all beyond words.
TRANSBOUNDARY AIR QUALITY GOVERNANCE: A CASE STUDY OF
THE PASO DEL NORTE AIR BASIN
1940-2000

by

LAURA MARGARITA URIBARRI, B.A., M.P.Aff., M.A.

DISSERTATION

Presented to the Faculty of the Graduate School of
The University of Texas at El Paso
in Partial Fulfillment
of the Requirements
for the Degree of

DOCTOR OF PHILOSOPHY

Department of History
THE UNIVERSITY OF TEXAS AT EL PASO
December 2021
Acknowledgements

I owe a tremendous debt of gratitude to so many people who were instrumental to the completion of this journey. First, I would like to thank the members of my dissertation committee. Dr. Samuel Brunk was a constant source of support, guidance and encouragement throughout my coursework, including many independent study courses, and the portfolio and dissertation stages. Dr. Ernesto Chavez was kind and patient even as he pushed me to think more deeply and critically about borderlands history from the time I began the program. Dr. Jeffrey Shepherd was always available with helpful words and direction, which were critical for me as a part-time student. In addition to providing invaluable insights on the geomorphology of river valleys, Dr. Richard Jarvis was unwavering in his enthusiasm through a particularly challenging time for all of us.

I am thankful to all of the History Department faculty who contributed to my academic formation. Drs. Cheryl Martin and Sandy Deutsch were amazing guides and mentors in Latin American History. I am so happy to have been their student. I also deeply appreciate the department staff who always provided the support I needed with kindness and care. Within the larger UTEP community, Dr. Thomas Gill in Geological Sciences, Dr. Wen-Whai Li in Civil Engineering, and Claudia Rivers in Special Collections gave generously of their time and expertise.

Of course, none of this would have been possible without the steadfast support of Dr. Robert Nachtmann - Dean of the College of Business Administration, mentor and champion - for much of the time I was in coursework. Although I know he would have loved for me to pursue a Ph.D. in business instead, he was nonetheless accommodating and encouraging always. My co-workers were a critical and constant source of positive energy and optimism.
I want to acknowledge all of those who shared their time, insights, expertise and resources with me as I researched the Paso del Norte Air Quality Task Force, since 1995. As a native of the Paso del Norte region, I am thankful to everyone who has worked diligently on transboundary collaborations to improve the air quality of the region. Dr. John Wirth introduced me to this initiative all of those years ago and I am so happy that he did. Lastly, I cannot thank Dr. Carlos Rincon enough for helping me to navigate this topic on both sides of the border, over the course of almost three decades.
Abstract

For thousands of years, the Paso del Norte region which today includes Ciudad Juárez, Chihuahua, El Paso, Texas, and Sunland Park, New Mexico, has been a strategic location by virtue of its geographic positioning at the lowest and easiest passage across the continental divide. During the 19th and 20th centuries as railroad networks connected the region to the far reaches of the U.S. and the interior of Mexico, it became a nexus for natural resource and labor extraction. Mining and smelting industries were later joined by agriculture and manufacturing to benefit from the transportation network and the abundance of labor. The region was transformed between 1940 and 2000 in terms of industrialization, physical footprint, and population expansion as a result of several bilateral treaties and agreements. The Paso del Norte region became a global manufacturing hub overwhelmed by mass migration, depressed wages, and a woefully insufficient public infrastructure that created unsafe and unhealthy living conditions for all of its residents. One of the outcomes of this unfettered growth was the deterioration of the air quality within the shared air basin. By the mid 1990s, the sister cities of El Paso and Ciudad Juárez had the worst air pollution along the border and each city ranked among the most polluted in its respective country.

This dissertation explores a six decade period of bilateral economic and labor agreements that facilitated the devastating degradation of air quality in the Paso del Norte air basin. It examines the factors that drove the dramatic growth in the region and the pressures that growth placed on limited public infrastructure. Finally, this dissertation explores how a group of fronterizos created a binational, multi-sectoral stakeholder organization named the Paso del Norte Air Quality Task Force, which became a catalyst for innovative air pollution abatement strategies and cross-border environmental protection in their community.
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Introduction

The US/Mexico border region is a geographically diverse area that spans two countries, four U.S. states, six Mexican states, twenty-six federally recognized US tribal reservations, thirty-five Mexican municipalities, and twenty-five U.S. counties. The border region also encompasses natural systems including three deserts, numerous rivers, the drainage basins of the Colorado River and the Rio Grande, and the binational air basins of a series of densely populated sister cities – all in a 2000-mile stretch between the Pacific Ocean and the Gulf of Mexico.

Situated in the middle of the 2000-mile border, the Paso del Norte region includes the jurisdictions of two federal governments, the Ysleta del Sur Pueblo Reservation, three states (Chihuahua, Texas and New Mexico), three primary municipalities (Ciudad Juárez, Chihuahua, El Paso, Texas, and Sunland Park, New Mexico), and a number of incorporated and unincorporated communities. It is characterized by a river valley formed by the Rio Grande (named the Rio Bravo in Mexico) which flows through the pass between mountain ranges. The Franklin Mountains are a north-south oriented mountain chain that nearly bisects El Paso. The Sierra de Juárez lines Ciudad Juárez along the southwest, while Mount Cristo Rey and the Rio Grande Rift surround Sunland Park. The Hueco Mountains flank the region to the east. In some places, the mountains that surround the Paso del Norte metropolitan area rise up over 3000 feet from the surrounding desert and the river valley, forming what looks like a bowl and is commonly referred to as an air basin.

For thousands of years, the Paso del Norte region has been a strategic location by virtue of its geographic positioning at the lowest and easiest passage across the continental divide – the mountainous, hydrological divide that bisects the Americas. During the 19th and 20th centuries as railroad networks connected the region to the far reaches of the U.S. and the interior of Mexico,
it became a nexus for natural resource and labor extraction. Industries of mining and smelting were later joined by agriculture and manufacturing industries that would similarly benefit from the transportation network and the abundance of labor. The region was transformed between 1940 and 2000 in terms of industrialization, physical footprint, and population expansion as a result of several bilateral treaties and agreements. The Paso del Norte region became a global manufacturing hub overwhelmed by mass migration, depressed wages, and a woefully insufficient public infrastructure that created unsafe and unhealthy living conditions for all of its residents. One of the outcomes of this unfettered growth was the deterioration of the air quality within the shared air basin. By the mid 1990s, the sister cities of El Paso and Ciudad Juárez had the worst air pollution along the border and each city ranked among the most polluted in its respective country.¹

This dissertation explores a six decade period of bilateral economic and labor agreements that facilitated the devastating degradation of air quality in the Paso del Norte air basin. While there are without question other significant areas of environmental pollution related to the unsustainable industrialization and urbanization in the region, including water and soil contamination, this study focuses on air pollution. It examines the factors that drove the dramatic growth in the region and the pressures that growth placed on limited public infrastructure. Finally, this dissertation explores how a group of fronterizos created a binational, multi-sectoral stakeholder organization named the Paso del Norte Air Quality Task Force (PDNAQTF), which became a catalyst for innovative air pollution abatement strategies and cross-border environmental protection in their community.

HISTORIOGRAPHY

My dissertation explores the transboundary environmental resource management of the U.S.-Mexico border region, with a specific focus on the air quality management of the Paso del Norte region. While the field of border environmental history is relatively young and the historiography is limited, I was able to draw on the historiography of boundary controls and transboundary resource management. The historiography that informs my research in the area of borderlands and fronterizo identity is extensive. The works I include in this historiography are not exhaustive but they are representative of the scholarship in these fields.

The works of Norris Hundley, Kelly Lytle Hernandez, Rachel St. John, and C.J Alvarez address the challenges of institutionalizing boundaries, managing the shared resources that exist at those boundaries, and negotiating the competing economic/political interests that clashed with the constructs of boundaries. Hundley’s work examines the disputes, negotiations, and treaties between the United States and Mexico with respect to the waters of the Rio Grande/Bravo, the Colorado, and the Tijuana rivers. Spanning almost a century of disputes between the two countries, Hundley presents a detailed account of the national and international politics involved in the eventual signing of the 1906 and 1944 treaties that govern surface water apportionment. Hundley argues that water apportionment was widely ignored by both countries until populations grew, at which point weak international law conventions gave way to bitter conflicts that these treaties sought to ameliorate.²

St. John’s work places the border at the center of the geographic struggle for demarcation, the development of regional economies, and as the subject of binational cooperation and conflict between the mid-nineteenth century and the 1930s. St. John documents

the actual surveying and establishment of the border that divided the U.S. and Mexico after 1848, then again following the Gadsden Purchase in 1853. She also illustrates the enormous gap in understanding of the border region between the Washington D.C./Mexico City negotiators and the border residents who knew the region best. C. J. Alvarez examines the physical infrastructure built along the border to enable control of people and natural resources. The built environment of enforcement-oriented apparatuses, Alvarez argues, is antithetical to the centuries of migration in the region and the dynamic flows of its natural resources.

Lytle Hernandez, meanwhile, explores the ways in which U.S. and Mexico border policy has shifted in light of the economic imperatives of both countries – at times in contravention of standing legal frameworks governing border controls and the infrastructure designed to enable those controls. Her work speaks to the fact that the built environment of border controls was utilized based on political and economic expediency.

The works of Oscar J. Martinez, Mario T. Garcia, Omar Valerio-Jimenez, Laura Gomez, and John McKiernan González explore political, economic, geographic, and environmental factors that have contributed to the formation of the fronterizo identity. Martinez’ work documents the historical development of the frontier region through an examination of Ciudad Juárez. Martinez intended for his work to challenge notions that Ciudad Juárez (and border communities generally) were not representative of Mexico or the Mexican experience. He questions notions of the border as a place bereft of culture and the tendency to characterize the

border region as a mere economic appendage of the U.S. García in turn examines the role of Mexican immigrants in the development of El Paso and the U.S. economy generally. Despite the importance of their contributions, García exposes the ways in which this community was segregated, manipulated and oppressed by the elite power structure in El Paso throughout the late 19th and early 20th century.

Valerio-Jiménez looks at the political and social transformations that took place among the residents and institutions in the lower Rio Grande region under Spanish, Mexican, and American governance between 1749 and 1900. He contends that the influx of nation-building influences, conflicts, and adaptations resulted in the development of a unique and dynamic ethnic and national identity. McKiernan González examines the way in which the U.S. government used medicine to construct notions of race and nationality along the US/Mexico border between 1848 and 1942. Gomez explores the designation of Mexican American as a race versus an ethnicity through an examination the political, civil, and social standing of Mexican Americans in the U.S. Southwest from 1846 through the turn of the century.

Environmental degradation along the U.S./Mexico border began to attract national attention during the 1970s and 1980s due to the rise of the maquiladora industry. Awareness and concern regarding border environmental conditions grew to even greater prominence during the negotiations leading up to the passage and implementation of the North American Free Trade

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Agreement (NAFTA) in the 1990s. Although the historiography of border environmental history is quite limited, the works of John Wirth, William deBuys, Samuel Truett, Evan Ward, and Monica Perales explore issues of environmental degradation, industrialization and natural resource management along the U.S./Mexico border. Wirth’s work examines smelter-related pollution at both the northern and southern borders of the United States from the late 1890s through the early 1990s. It looks at the evolution of business practices and public policy related to smelter-produced transboundary air pollution through two cases that span the North American continent. According to Wirth, the pollution issues related to these smelters became the impetus for transboundary negotiation and cooperation between the U.S. and Mexico during the 1980s.

DeBuys’s work looks at the accidental formation of the Salton Sea in the Southern California Imperial Valley. He traces the evolution of the region and the binational consequences of the incessant efforts to control nature for the benefit of agriculture and development. Similarly, Ward’s environmental history of the Colorado River delta illustrates the ecological collapse that resulted from the development of an “agricultural oasis” in deserts of Arizona, California, Sonora and Baja California during the mid-20th century. Ward artfully presents the binational tensions that unfolded as a result of this environmental debacle. He also sheds light on the complex political, economic and diplomatic battles that ensued within the U.S. as the federal government worked through remediation options.

Truett weaves together the stories of native and immigrant inhabitants of the Arizona/Sonora copper-producing region in order to restore forgotten histories of survival and failure. He explores the efforts by entrepreneurs, investors, and area residents to dominate and profit from the region’s natural resources at the turn of the twentieth century. Truett credits the subaltern power of the fugitive landscapes with disrupting and derailing these economic schemes through social unrest, revolutions, and other unanticipated barriers. Perales documents the development, evacuation and eventual demolition of Smeltertown – a Mexican American community that formed at the base of the highly polluting American Smelting and Refining Company (ASARCO), in El Paso, from the late nineteenth century through the end of the twentieth century. Perales chronicles the human health fallout caused by ASARCO’s operations and social consequences that followed the razing of Smeltertown.

This dissertation contributes to the border environmental historiography by exploring the causal relationships between the industrialization of the U.S.-Mexico border and the environmental degradation that ensued. Within this historiography, there has been much greater attention given to transboundary water resources. This dissertation expands the limited historiography of transboundary air resources, with a focus on the largest binational metropolitan community along the border and its shared air basin. It documents the physical characteristics of the Paso del Norte river valley and the ways in which these characteristics combined with a number of socioeconomic factors to create the conditions for the progressive deterioration of the air quality in the region. It also examines the human health consequences resulting from rapid industrialization and population growth between 1940 and 2000. Perhaps most distinctively, this

work documents a case study of a cross-border coalition that navigated complicated jurisdictional barriers in order to more effectively address the shared air quality management challenges they faced. In doing so, it created a model that was subsequently codified in the La Paz Agreement and became the blueprint for the engagement of fronterizos in border environmental resource management. This study is significant because it chronicles a binational environmental crisis that actually led to a fronterizo-led shift in shared resource management.

My dissertation also contributes more broadly to borderlands historiography. It analyzes the evolution of treaties, binational agreements and federal institutions related to the governance and management of the U.S./Mexico border region and its natural resources. This work demonstrates the slow progression of these regulatory structures from dictatorial mandates given from Washington D.C. and Mexico City, to more inclusive spaces where civil society is a recognized stakeholder. Furthermore, this study argues that the impetus for cross-border multi-sectoral environmental activism in the Paso del Norte region is rooted in the historical formation of the fronterizo identity.

**FRAMEWORK AND METHODOLOGY**

My dissertation utilizes a borderlands framework that focuses on two primary concepts. The first concept posits that the borderlands are situated at the periphery of nation-states but those who live in the borderlands do not consider themselves peripheral – rather they see themselves as central to a unique economic, political, and social transboundary dynamic. The second concept is that the legal institutions responsible for oversight and management of the U.S. Mexico border as a jurisdictional boundary are woefully insufficient for the management of the dynamic flow of people and transboundary natural resources.
The first concept was heavily influenced by Samuel Truett and Elliott Young’s anthology *Continental Crossroads: Remapping U.S.-Mexico Borderlands History*, Juan Mora Torres’s *The Making of the Mexican Border: The State, Capitalism, and Society in Nuevo León, 1848-1910*, and Michiel Baud and Willem Van Schendel’s essay “Toward a Comparative History of Borderlands.” The Truett and Young anthology extends the constructs of borderlands history into a transnational dialogue that bridges historical periods, national boundaries, and academic disciplines. The editors argue that borderlands histories are important to mainstream U.S. and Mexican histories because the “periphery” is critical to understanding the history of the nation-states.¹⁷

Mora Torres explores what he calls Mexico’s “frontier to border” phase, focusing on the northeastern state of Nuevo Leon. This narrative examines the period between the creation of the U.S./Mexico border in 1848 and the beginning of the Mexican Revolution in 1910. Mora Torres argues that during this period, Mexico’s northern border region emerged as a distinct geographic area with unique social, political, cultural, and economic characteristics that altered the center-periphery relationship.¹⁸

Michiel Baud and Willem Van Schendel differentiate between the terms *boundaries* and *borders* to make a critical conceptual distinction in the study of borderlands. Baud and Van Schendel contend that the term *boundaries* conveys the existence of a physical or cultural divide, essentially the end of something. The term *borders*, meanwhile, is more often utilized to emphasize a region surrounding a line of demarcation - a shared space on either side of that line.

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with its own unique idiosyncrasies.\textsuperscript{19} These three works present the borderlands as something far greater than just the edges of political jurisdictions. Instead, they posit a reversal of the center-periphery relationship that situates borderland residents as catalysts for that dynamic. They acknowledge the unique cultures and identities that are born within what Mora refers to as the “contact zones” created by nation boundaries.

The second concept is informed by the work of social science scholars whose theoretical models reflect the changing order of transnational relations, whereby the boundaries between domestic and foreign policy have become blurred because of increasingly globalized economies and complex trading blocks. This scholarship points to a departure from traditional geopolitical frameworks such as Immanuel Wallerstein’s \textit{World Systems Analysis}, that position nation-states as the central actors in the capitalist world economy.\textsuperscript{20} Instead, these scholars recognize the prominence of non-state actors, international organizations, NGOs, and multi-state actors in the international political economy. Jan Aart Scholte and A. Schnabel’s \textit{Civil Society and Global Finance} has helped me think about this global transformation in the context of the U.S. Mexico borderlands.\textsuperscript{21} Margaret E. Keck and Kathryn Sikkink’s \textit{Activists beyond Borders: Advocacy Networks in International Politics} also provides a valuable framework for understanding a changing world order within which recognition of human rights and environmental protection has become inseparable from trade negotiations.\textsuperscript{22}

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\textsuperscript{22} Margaret E. Keck and Kathryn Sikkink, \textit{Activists beyond Borders: Advocacy Networks in International Politics} (Ithaca: Cornell University Press, 1998).
Peter M. Haas has published several influential works related to social learning and collective community formation as it relates to the evolution of multilateral environmental governance and policy coordination. He provides a valuable theoretical framework within which to consider the air quality improvement efforts in the Paso del Norte region. Specifically, Haas utilizes the concept of ecological and transnational epistemic communities to explain the advancement of human knowledge and global policy. He describes an epistemic community as a network of professionals with expertise and competence in a particular area or domain who can provide policy-relevant knowledge within that area or domain. Collectively, these works have helped me contextualize cross-border coalitions such as the Paso del Norte Air Quality Task Force within a global schema in which multiple stakeholders apply pressure to the levers of power and policy.

This dissertation is written from the perspective of the *fronterizos* from the Paso del Norte region. It provides a counter narrative to the center-to-periphery view that has dominated governance of the border region. It is informed by the documents gathered from PDNAQTF members, JAC appointees, and government officials over many years. This research began in 1995 when I initiated my academic inquiries into the fledgling PDNAQTF for my senior honors thesis. In 1997-98, my master’s professional report explored the transboundary policy strategies that could help to address border environmental challenges in the Paso del Norte Air Basin. For this study, I revisited the volumes of meeting minutes, project reports, intergovernmental letters and memos, and oral interviews with the benefit of two additional decades of historical context. I also gathered additional documents from the U.S. EPA Border Region office in El Paso, from the El Paso Electric corporate archives, as well as online archives of several federal and state

agencies in both countries to properly situate this study within the context of U.S.-Mexico borderlands history.24

**Structure of Dissertation**

Chapter one, “Transformation of the Paso del Norte Region,” situates the region within the larger history of migration and development of what is now the U.S.-Mexico borderlands. For thousands of years, the Paso del Norte region has been a strategic location by virtue of its geographic positioning. The fertile river valley served as a hospitable respite for travelers and settlers who traversed the rugged high-desert region. The indigenous trade routes and seminomadic settlements that first ushered commerce and travelers through the desert mountain pass evolved in concert with the political and industrial developments of the last five centuries. This was particularly true starting in the late 1800s when railroad networks primed the region for the natural resource and labor extraction that would grow in the decades to follow. Throughout the 20th century the agriculture and manufacturing industries grew exponentially. By the latter half of the 20th century, the Paso del Norte region was a global manufacturing hub hobbled by insufficient infrastructure and rampant poverty.

Invariably, economic growth and industrialization without proper public infrastructure and pollution controls comes at a cost to environmental and human health. Chapter two, “Environmental and Human Health Fallout in the Paso del Norte,” examines the deterioration of air quality and the related human health issues that accompanied the region’s growth. It begins with some historical context for air pollution regulation in the United States and Mexico in order

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to understand how each country developed and amended regulatory frameworks during the twentieth century. By extension, it looks at how these frameworks were implemented along the border. It explores how air pollution was monitored and regulated in the Paso del Norte air basin, given the different regulatory regimes in this binational, tristate region. It also delves into the principal sources of air pollution in the region, specific pollutants that are major contributors to the air quality problems, and the human health effects of those pollutants. Finally, this chapter considers the development of the region and the accompanying environmental protections from the perspective of environmental justice and fractured governance in order to better understand how environmental regulatory regimes failed to protect the residents of this borderland.

In order to better comprehend the environmental challenges and mismanagement along the border, chapter three, “Governing Structures of the U.S. Mexico Borderlands,” considers series of binational agreements between the US and Mexico intended to strengthen the sovereignty and power of the federal governments on either side of the nascent boundary. Some of these agreements were designed to create mutual, albeit disparate, benefit in economic and environmental spheres. This chapter explores the development and evolution of treaties and other mechanisms designed to manage shared natural resources and protect the environmental health of the U.S.-Mexico border region. For comparative purposes, it examines a relevant treaty related to the U.S.-Canadian border as well. It also analyzes the ways in which formal bilateral frameworks became increasingly collaborative and responsive to frontera communities that demanded solutions to address the challenges of managing and protecting transboundary natural resources. While this is not an exhaustive analysis of environmental agreements between the U.S. and its neighbors, it pays particular attention to those that have proven to be most consequential to the borderlands in the second half of the twentieth century.
Chapter four, “Fronterizo Advocacy in the Paso del Norte Air Basin Sets the Stage for the Transformation of Border Environmental Management,” introduces the Paso del Norte Air Quality Task Force (PDNAQTF). This fronterizo-led consortium of business leaders, NGOs, physicians, researchers, and government officials operationalized cross-border cooperation and transboundary natural resource protection in response to a failed environmental governance structure that resulted in the worst air quality along the U.S.-Mexico border during the late 1980s and early 1990s. This chapter looks at the origins and formation of the PDNAQTF, as well as the impact of the projects it developed. The most significant of these projects was the adoption of Appendix 1 to Annex V of the La Paz Agreement, which created the Joint Advisory Committee on Air Quality Improvement for the El Paso – Ciudad Juárez – Doña County Air Quality Management Basin (JAC). This chapter explores the early work of the JAC and concludes that its structure became the blueprint for community engagement in the border environmental management frameworks that had historically excluded frontera communities.

Chapter five, “Ciudad Juárez Brick Kilns: A Case Study in Innovative Cross-Border Collaborations, Failed Good Intentions, and Appropriate Technologies,” explores one particularly noteworthy pollution abatement initiative. In the late 20th century, Ciudad Juárez’s primary sources of pollution were motor vehicles, unpaved roads, and open burning. All of these emissions sources grew along with this sprawling city as industrialization took hold during the 1970s and 1980s. One informal sector that expanded in order to keep up with demand for new housing construction was the brickmaking business. Ladrilleros, as brick makers are called in Spanish, provided their community a valuable commodity, but their production methods involved open burning of highly polluting fuels that produced tons of toxic emissions. This chapter explores the innovative fronterizo-led binational efforts to work with the ladrilleros to
develop more efficient production technologies, reduce emissions, and improve their well-being.

It examines the way in which the ladrilleros themselves helped reframe the challenges in order to create appropriate technologies that could be adopted in their communities and replicated in microenterprises worldwide. Finally, it illustrates the opportunity for significant and cost-effective pollution reduction through cross-border emissions reductions credits.

Finally, chapter six “Frontera Collaborators and Stakeholders” highlights a few of the individuals who provided leadership, continuity and direction to the PDNAQTF and eventually the JAC. For years, the projects and initiatives of the PDNAQTF were carried out by individuals who volunteered their time or stretched their official job descriptions in order to facilitate the innovative cross-border collaborations explored in this dissertation. This chapter gives us some insight into the personal and professional backgrounds of those individuals. Through a series of oral interviews, we learn about the motivations, frustrations, and aspirations that guided their engagement. These perspectives help inform our understanding of the diverse group of fronterizos who helped redefine and reframe transboundary environmental governance.

Together, these chapters demonstrate that decades of flawed and short-sighted policies originating in Washington D.C. and Mexico City to create strategic trading blocks and stimulate the economies of the hemisphere came at an extraordinary expense to the frontera. Impoverished communities along the border were left desperate for the infrastructure to meet their most basic necessities and burdened with an environmental and human health crisis. In response to this crisis, fronterizos in the Paso del Norte region and their allies formed an advocacy coalition that sought accountable governance and solutions to their air quality. This coalition, rooted in their fronterizo-identity, made remarkable progress in reframing the engagement of frontera-communities in border environmental management and creating the precedent for innovative
cross-border pollution abatement projects. Despite these notable accomplishments, I conclude that so long as federal investment in environmental infrastructure and regulatory enforcement continues to be misaligned with economic imperatives, border communities will live with the inordinate and unjust burden of trade-related pollution.
Chapter One: Transformation of the Paso del Norte Region

The US/Mexico border region is a geographically diverse area that spans two countries, four U.S. states (Texas, New Mexico, Arizona, California), six Mexican states (Tamaulipas, Nuevo Leon, Coahuila, Chihuahua, Sonora, Baja California), twenty-six federally recognized US tribal reservations, thirty-five Mexican municipalities, and twenty-five U.S. counties. The border region also encompasses natural systems including three deserts, numerous rivers, the drainage basins of the Colorado River and the Rio Grande, and the binational air basins of a series of densely populated sister cities – all in a 2000-mile stretch between the Pacific Ocean and the Gulf of Mexico. Despite the many political jurisdictions at play in this region, the people who have lived along both sides of the US/Mexico border have formed part of a series of intricately intertwined cross border communities since 1848. It was within this socioeconomic and geographic context that extraneous political and economic forces brought unprecedented population growth and industrial expansion to the border region between 1940 and 2000. By the end of the 20th century, the US/Mexico border was the most crossed border in the world and the Paso del Norte region was the largest contiguous binational metropolitan area along the US/Mexico border. 25

For thousands of years, the Paso del Norte region has been a strategic location by virtue of its geographic positioning at the lowest and easiest passage across the continental divide – the mountainous, hydrological divide that bisects the Americas. The fertile river valley located at the base of two mountain ranges, surrounded by barren plateaus, served as a

hospitable respite for those who traversed the rugged high-desert region. Twelve thousand years ago, indigenous peoples arrived at this desert pass, attracted by an abundance of edible plants and animals and the natural ford in the Rio Grande. Over the centuries, travelers and settlers have left archeological footprints. In the 1530s, when Spanish explorers first came upon the area, they encountered the seminomadic Suma and Manso Indians, who utilized this pass as a trade route to link the north and the south. In 1581, a Spanish missionary expedition followed the indigenous pathways northward along the Rio Grande and came upon the site they named El Paso del Norte (the Pass of the North). Attracted by the natural ford in the river and the edible flora and fauna, El Paso del Norte became a rest stop for subsequent expeditions.  

In 1598, the Spanish explorer Don Juan de Onate took formal possession of this area drained by the Rio Grande. El Paso del Norte was claimed by Spain for more than two centuries. Formal settlements in El Paso del Norte began with the founding of the mission of Nuestra Señora de Guadalupe in 1659, which is still standing in downtown Ciudad Juárez. In 1680, there was a massive Pueblo revolt against Spanish rule in New Mexico. This revolt caused Spanish settlers and several hundred Tigua Indians to flee south to the Pass, where they found safety. These refugees formally established El Paso del Norte (where Ciudad Juárez is currently located), San Lorenzo, Senecu, Ysleta, and Socorro, as a chain of communities along the Rio Grande. In 1789, settlers built a presidio further downstream in San Elizario to protect against raiding Apaches. This area

was a trade center on the historic Camino Real and a flourishing agricultural site where vineyards were said to produce top quality brandy and wine.\(^2^8\)

By the mid-1820s, under Mexican rule, El Paso del Norte engaged in trade with the U.S. via the Santa Fe-Chihuahuan trail. Trade along this trail grew until this area and the rest of the Southwest became a target of American Manifest Destiny. In 1846, when clashes broke out between Anglos and Mexicans, troops swept through El Paso del Norte to battle further south in Chihuahua. In 1848, the Treaty of Guadalupe de Hidalgo was signed, dividing El Paso del Norte with an international boundary that was fixed at the Rio Grande. What we know today as Ciudad Juárez was called Paso del Norte and El Paso was called Franklin. During that year, a military post that would later be named Fort Bliss was established to house four Companies of the Eighth Infantry.\(^2^9\)

In the mid-nineteenth century, the rush of gold prospectors traveling to California introduced an east-west component of traffic to El Paso (Franklin became known as El Paso in the 1850s). By 1857, regular stagecoach travel traversed the region on its way to San Diego, formalizing the southern land route connecting the east and west. Between 1881 and 1884, several rail lines, including the Southern Pacific Railroad, the Atchison-Topeka-Santa Fe, the Texas-Pacific, the Galveston- Harrisburg-Topeka had reached El Paso while a line from Mexico City had reached Paso del Norte (renamed Ciudad Juárez in 1888). This development as a rail hub made El Paso an important point within a growing transportation network that connected the continent’s economies.\(^3^0\) During the four


decades that followed the arrival of the railroad, the small frontier town of El Paso with fewer than 1,000 residents became a modern western city with 80,000 inhabitants.\textsuperscript{31}

Paso del Norte did not fare as well during this period. Although the town was bolstered by the implementation of a free trade zone in 1885 that enabled significant economic growth and commerce, this prosperity was short lived. In 1891, the Mexican government rescinded the free trade zone, thereby crippling Mexican border economies due to the tariffs on imports from the U.S. and the enormous distance between border cities and Mexico’s production center. Paso del Norte also benefitted less from the arrival of the railroad because it did not have an east-west rail connection, therefore trade to and from the coasts had to go through El Paso and was subject to tariffs. While El Paso was experiencing a population boom, the population of Paso del Norte/Ciudad Juárez had dwindled from between 20,000 in 1885 to just over 11,000 in 1910.\textsuperscript{32}

With a rail network that connected the farthest south of the east-west routes through the Rockies with one that provided a gateway to Mexico’s natural resources, the Paso del Norte region was poised to figure prominently in mineral extraction plans of American financiers and industrialists. In 1887, a business partnership built a smelter known locally as El Paso Smelter Works, establishing El Paso’s first major industry on the north bank of the Rio Grande – near where Onate had crossed the river three hundred years earlier. In 1899, this smelter was incorporated into the transnational smelting operation of American Smelting and Refining Company (ASARCO). The ample transportation facilities and the strategic location near Arizona, New Mexico, Texas, and several northern

\textsuperscript{32} Martinez, \textit{Border Boom Town}, 26-27, 33.
Mexico mining operations meant that this would become the most important custom smelter in the Southwest. El Paso soon became the site of miners’ conventions and the home of a school for training miners.33

Growth in population and the agricultural industry along the border strained demands for surface water amidst a water shortage at the turn of the century. In 1906, the U.S. and Mexico signed the Water Allocation Treaty that divided the waters of the Upper Rio Grande. The Treaty called for the U.S. government to build Elephant Butte Dam on the Rio Grande, 125 miles upstream from El Paso. Construction of the dam meant that the unpredictable river flow, which was often responsible for flooding and property damage, would be controlled. Furthermore, millions of dollars would be invested in constructing irrigation ditches and diversion dams, thereby expanding the region’s fertile farmland.34

By 1912, Elephant Butte was operational and reduced variability in annual flow from the river by approximately seventy percent, while total annual flow from the river was thirty percent shorter (as measured 1915-1927). This meant that the river produced a steady flow throughout the year with a measured increase during the growing season. Water allocation, as designated in the Water Allocation Treaty, provided for agricultural lands in the Mesilla valley of New Mexico as well as for farmers in El Paso and Ciudad Juárez.35

Convinced of the opportunity the dam represented for El Paso, investors, speculators, and settlers “arrived in droves.” The anticipated prosperity certainly materialized for the affluent but bypassed the largely Mexican American working class. As a result of Elephant

33 Monica Perales, Smeltstown: Making and Remembering a Southwest Border Community (Chapel Hill: University of North Carolina Press, 2010), 33, 34.
34 Martinez, Border Boom Town, 33; Norris Hundley Jr., Dividing the Waters – A Century of Controversy Between the United States and Mexico (Berkeley: University of California Press, 1966), 21.
Butte Dam, the region's economic base expanded from one dominated by railroads, mining, ranching, and trade, to include oil refining, natural gas, lumber, construction materials, metal working, textiles, manufacturing, real estate, banking, and tourism. Agriculture was also revolutionized, as large growers cultivating alfalfa and cotton with modern farm machinery began replacing the small farms and the vineyard culture.36

The indigenous trade routes and seminomadic settlements that first ushered commerce and travelers through the desert mountain pass evolved in concert with the political and industrial developments of the last five centuries, and this was particularly true starting in the late 1800s. As railroad networks connected the region to the US coasts and to the interior of Mexico, it became a nexus for natural resource and labor extraction that would grow in the decades to follow. Industries of mineral extraction and smelting were later joined by manufacturing industries that would similarly benefit from the transportation network and the abundance of labor.

Describing the development of the border region as a “contact zone,” Juan Mora-Torres argues this was the result of migration, the external imposition of boundaries, and distant governance without accountability. This confluence of factors created an environment in which border residents – fronterizos – were forced to protect themselves, create their own economies, and develop their own social structures, irrespective of the nation states that claimed this contact zone. Mora-Torres describes a fronterizo identity that borderlanders developed over decades of de facto self-rule. The concept of a fronterizo identity certainly seems appropriate

as one considers the development of the Paso del Norte region and the ways in which its residents adapted to internal and external forces.\textsuperscript{37}

**GEOGRAPHY AND CLIMATE OF THE PASO DEL NORTE REGION**

In order to more fully comprehend the environmental fall-out of rapid industrialization and population growth in the Paso del Norte region, it is important to understand the geographic characteristics which combined with industrial and socio-economic factors to create particularly detrimental air quality conditions. The region is located in the Chihuahuan Desert of the Basin and Range geomorphic province. There are strong topographical variations in the metropolitan area. The river valley is formed by the Rio Grande (named the Rio Bravo in Mexico) river which flows through the pass between mountain ranges. The Franklin Mountains are a north-south oriented mountain chain that nearly bisects the City of El Paso. The Sierra de Juárez lines Ciudad Juárez along the southwest, while Mount Cristo Rey and the Rio Grande Rift surround the metropolitan area that is located in southern New Mexico. The Hueco Mountains flank the region to the east. Surface elevations in this area range from 3750 feet above sea level along the river to 7192 feet at the top of North Franklin Mountain. The mountains that surround the Paso del Norte metropolitan area rise up over 3000 feet from the surrounding desert and the river valley in some places, forming what looks like a bowl or what is commonly referred to as an air basin.\textsuperscript{38}


From an aerial perspective, it is not possible to distinguish the numerous national, state, and local political jurisdictions contained within the air basin. Naturally, the air moves through and within this binational air basin without regard to regulatory structures or jurisdictional limitations. The image above illustrates the tristate binational region with its mountain ranges denoted in yellow text. Figure 2 illustrates the rise in elevation from the Rio Grande valley in Sunland Park, New Mexico to the Franklin Mountains in El Paso in the background.39

As a part of the Chihuahuan Desert, the region has a semi-arid climate that consists of relatively dry, cool winters and warm summers with a monsoon season. It is rather common in this high desert environment for diurnal temperatures to have a 20 to 30 degrees range, meaning that the high temperature is often 20 to 30 degrees higher than the low temperature experienced on a given day. U.S. National Weather Service data from 1981 to 2010 indicates that the average high temperatures recorded in the El Paso area for the months of June and December were 96.4 and
58 degrees, respectively. The average low temperature for those same months were 67.5 and 32.1 degrees respectively.40

During winter months, the physical characteristics of the air basin combined with the diurnal temperature ranges provide the conditions for temperature inversions. Temperature inversions occur when cool air drains from the nearby highlands and pools in the lower elevations during the night when temperatures drop to their lowest. The cooler heavier air, combined with pollutants produced by the residents, industries, and motor vehicles in the air basin, is trapped by a layer of warmer air above it. When temperature inversions occur, the region is covered by a dense smoky brown layer of pollutants that is visible throughout the night.

Figure 3. Temperature Inversion in the Paso del Norte Air Basin

and into the early morning. During the morning hours, insolation from the sun heats the lower layer of cool air, allowing it to mix with the warmer air above it and eventually dissipate the trapped pollutants. Figure 3 illustrates what a temperature inversion looks like in the Paso del Norte air basin.41

Dust storms are also common in the air basin during the windy months of March, April and May. These wind events are often strong enough to cause air quality degradation and decreased visibility due to the dust and sand particles carried by the winds. Meteorologists who observe dust storms in the region may describe an event as “haze,” “suspended dust,” “blowing dust” and “dust storm” based on the duration of the event, wind speeds, and visibility. The wind carries dust particles that are a product naturally occurring surfaces as well as anthropogenic activity that cause “fugitive dust” such as agriculture and unpaved roads. Studies have found that the primary sources of dust emissions in the region during major windstorms are the playas (dry lakes) and fallow agricultural lands in the surrounding areas.42

During the spring and summer, the hot and sunny days provide the perfect conditions for the atmospheric chemical reactions that produce ground-level ozone. The barriers formed by the mountain ranges make it especially difficult for pollutants to disperse, particularly because of the absence of a regular wind current to help clear the air basin. Taken in combination with the

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geography, the industrialization, rapid population growth and unplanned urbanization resulted in the significant degradation of the region’s air quality during the 1970s through the 1990s. 43

**ECONOMIC POLICY AND INDUSTRIALIZATION**

Despite a complicated and often conflictive history between the U.S. and Mexico, the government leaders of the two countries have established mutually beneficial labor and economic agreements that have become pillars of the bilateral relationship. These agreements have had a significant impact on the development of the Paso del Norte region in the latter half of the twentieth century. While this is not an exhaustive analysis of the bilateral agreements between the two countries, it contemplates those that have been most transformational to the region in terms of industrialization, infrastructure, and population growth.

In the early 1940s, the United States was in the midst of World War II and was facing a labor shortage in the agriculture and railroad industries. Mexico was also entering the war effort, while facing high levels of unemployment. In many ways, World War II linked Mexico’s economic development interests with the United States’ national security imperatives. Between 1941 and 1942, the U.S.-Mexican Commission for Wartime Cooperation facilitated technical assistance to improve Mexican railroads and the U.S. government invested more than $23.5 million on Mexican railroad bonds. The U.S. also spent $9.1 million on the construction of the Pan American Highway, which connected the interior of Mexico to the U.S. border at Ciudad Juárez. While the initial intent of the new transportation infrastructure was to enable the export

of Mexican oil and agricultural products to the U.S., it also become a tool for the movement of Mexican labor to U.S. employers.\textsuperscript{44}

Having identified an opportunity to address desperate labor situations in both countries – utilizing the convenient and politically acceptable guise of supporting the Allied war effort - Presidents Franklin D. Roosevelt and Manuel Avila Camacho established the \textit{Bracero} Program through an exchange of diplomatic notes in August, 1942.\textsuperscript{45} Although the \textit{Bracero} Program was initiated to address wartime labor demands, it was kept in place long after the conclusion of hostilities overseas due to economic expediencies and pressures from U.S. agribusiness. Between 1942 and 1964, over 4.5 million contracts were issued to Mexican laborers as a part of the \textit{Bracero} Program.\textsuperscript{46}

For the duration of the \textit{Bracero} Program, Ciudad Juárez served as a labor processing center and as such became the recipient of thousands of internal migrants seeking labor contracts in the U.S.\textsuperscript{47} According to US Border Patrol officials, the twin cities of El Paso and Ciudad Juárez also became the crossing site for an unprecedented number of undocumented laborers who sought entry to the U.S. but chose to bypass the formal contracting process. This meant that Ciudad Juárez became a staging site for tens of thousands of migrant laborers documented through the \textit{Bracero} Program and undocumented.\textsuperscript{48}

\textsuperscript{44} Kelly Lytle Hernandez, \textit{Migra!: A History of the U.S. Border Patrol} (Berkeley: University of California Press, 2010), 112-113.
\textsuperscript{47} Martinez, \textit{Border Boom Town}, 110.
El Paso County was the site of several Bracero processing centers in addition to attracting clandestine labor contractors seeking undocumented workers. An unknown number of those migrant laborers also moved their families from the interior of Mexico to Ciudad Juárez in order to facilitate off-season visits or migration to the U.S., should the opportunity arise.\textsuperscript{49} Between 1940 and 1950, Ciudad Juárez had an average annual percentage growth of internal migration of .68 percent - that figure jumped to 2.93 percent per year for the period of 1950 to 1960.\textsuperscript{50} During this same period, census figures show that the population of El Paso County grew from 131,067 in 1940 to 194,968 in 1950, a 48.8\% increase in population. From 1950 to 1960 the population grew to 314,070, a staggering 61.1\% jump in population.\textsuperscript{51}

Between 1944 and 1954, U.S. demand for cheap Mexican labor drove documented and undocumented migration through border communities and into various locations throughout the country.\textsuperscript{52} This influx of foreign-born workers during a post-war economy heightened anti-immigrant rhetoric and prompted deportation policies. During the 1940s, the US Immigration and Naturalization Service policy called for apprehended undocumented persons to be released all along the Mexican border. Displeased with this policy, Mexican officials requested that deportees be released only in Ciudad Juárez and Nuevo Laredo, where rail service would facilitate their reintegration to the interior of Mexico. Often, this new arrangement did not result in a reintegration of migrants to the interior due to the difficulty and expense associated with returning to their communities of origin. Instead, the deportees contributed to the expansion of an

\textsuperscript{49} Martinez, \textit{Border Boom Town}, 111.
\textsuperscript{51} Texas Association of Counties, The County Information Project. \textit{Historic El Paso County Population: 1850-Present}, http://www.txcip.org/tac/census/hist.php?FIPS=48141 (accessed September 22, 2019), Author is utilizing County of El Paso census figures rather than City of El Paso because processing centers were located throughout the county and not necessarily within the city limits.
\textsuperscript{52} Hernandez, \textit{Migra!}, 169.
unemployed border population. This migrant/deportee population surged in 1953 and 1954 as a result of aggressive deportation initiatives including Operation Wetback - a massive deportation campaign launched by President Dwight D. Eisenhower’s administration in May 1954. Many of these deportees were released in Ciudad Juárez, with thirty-six thousand crossing into the city in less than one week in July 1954.\(^\text{53}\)

Facing mounting pressures from labor unions that accused Mexican laborers of depressing wages for U.S. workers, the U.S. government unilaterally terminated the *Bracero* Program in 1964. With *Bracero* contracts gone, tens of thousands of Mexican laborers were returned to Mexican border cities with few options for employment. Local authorities were overwhelmed by this sudden surge in population, with migrants forced to live in perilous conditions.\(^\text{54}\)

The Mexican Government was desperate to find a solution to the crises emerging in border communities. It began evaluating economic development options through The National Frontier Program of Mexico (in Spanish *Programa Nacional Fronterizo* – known by its acronym PRONAF).\(^\text{55}\) That year, the PRONAF commissioned the consulting group Arthur D. Little de Mexico, S.A. to assess the feasibility of developing manufacturing capabilities in Ciudad Juárez. This coincided with efforts from the Ciudad Juárez business community to develop a Bonded Manufacturing Zone similar to one established in Mexico City during the 1940s to facilitate the integration of foreign automotive manufacturing. The premise of the Bonded Manufacturing Zone was to create an enclosed industrial area under customs control where imported raw and

\(^{53}\) Martinez, *Border Boom Town*, 113.


\(^{55}\) Ibid.
semi-manufactured materials could be processed and finished for export markets without being subject to duty payments.\textsuperscript{56}

This feasibility study provided an assessment of the readiness of the region for manufacturing. It included an inventory of the region’s critical production-related assets as well as the established economic sectors in the state of Chihuahua, which could be supportive of manufacturing in Ciudad Juárez. It highlighted the benefits of the geographic location with proximity to the U.S. and connectivity to rail and ground transportation hubs with north/south and east/west orientations. It looked at the availability of utilities, including access to potable water through the use of wells and access to uninterrupted electricity – emphasizing the advantages of grid interconnection with the U.S. for increased reliability. The report made clear that Ciudad Juárez would be able to provide all of the infrastructure a manufacturer would need to be successful.\textsuperscript{57}

For the purposes of this analysis, the most compelling part of this report was related to the availability of plentiful low-cost labor and the higher standard of living in Ciudad Juárez relative to other parts of Mexico. It noted a seven-fold increase in the Ciudad Juárez population between 1930 and 1960. It stated that only one third of that population growth was attributable to natural increases, with the balance due to migratory flows from other Mexican states – as far away as Oaxaca. It also referenced a “build-up” of approximately nineteen thousand applicants from central Mexico who were in Ciudad Juárez awaiting “permanent working papers” for the

\textsuperscript{56} Arthur D. Little de Mexico, S.A. “Industrial Opportunities For Ciudad Juárez” Report to The National Frontier Program of Mexico, August 1, 1964, 28. Copy with author.
\textsuperscript{57} Arthur D. Little de Mexico, 18, 23-26.
U.S. It also referred to a group of about fifteen thousand workers who lived in Ciudad Juárez and worked on the U.S. side of the border.\textsuperscript{58}

Regarding labor costs, the report indicated that wages with fringe benefits for unskilled workers amounted to about $3 per day, compared to $10 per day in the U.S. without benefits. Wages for semi-skilled and skilled labor were correspondingly lower. The same assessment was given for salaries of managerial and professional workers. The report concluded that although wages would likely increase by some amount in the coming years, the continuous supply of labor coming from the interior of Mexico, where wages were even lower, would limit the rate of wage increases in Ciudad Juárez for the foreseeable future. This wage comparison was provided to highlight the labor cost advantages that U.S. manufacturers would have if they established labor intensive operations in Ciudad Juárez.\textsuperscript{59}

As had occurred with the implementation of the Bracero Program, United States and Mexican governments came together once again in an economic partnership that addressed their respective goals - the U.S. was searching for labor markets that would allow it to improve its standing in the global trade arena and Mexico was desperate to create employment opportunities for former Braceros and other unemployed Mexicans who congregated in border communities. In 1965, the U.S. passed a new tariff law which exempted U.S. goods assembled partially or completely abroad from general import duties. These goods would only be subject to tariffs for value added in manufacture, thereby creating an import structure that made it cheaper to assemble some goods outside of the U.S.\textsuperscript{60}

\textsuperscript{58} Arthur D. Little de Mexico, 2, 17.
\textsuperscript{59} Arthur D. Little de Mexico, 2, 19-21.
\textsuperscript{60} Ganster and Lorey. \textit{The U.S.-Mexican Border Today}, 110.
That same year, the Mexican Government introduced the Border Industrialization Program (BIP) - also known as the maquiladora program – which eliminated tariff consequences for foreign manufacturers that established operations and created jobs in Mexican border communities. Maquiladoras were allowed to import equipment, parts, and supplies duty-free so long as their output was exported back to the U.S. The BIP effectively provided a Mexican government-subsidized manufacturing zone complete with abundant low-wage Mexican labor for foreign investors willing to establish facilities and create jobs along the border. 61

Consistent with traditional trade theory that was prevalent in the 1960s that predicted that capital and investment flows to where capital is scarce, labor is abundant, and returns are highest, U.S. manufacturers responded to the BIP. Initially, there was slow but steady industrial growth in the border region. The first industrial parks were built simultaneously in Ciudad Juárez and Nogales, Sonora. Industrial parks were later established in Tijuana and Mexicali in Baja California, as well as in Reynosa and Matamoros in Tamaulipas. Maquiladoras were set up by U.S. companies such as RCA, Sylvania, Ampex and others. Early production included electronics, textiles, toys, and footwear. In 1969, there were 147 BIP-registered companies employing 17,000 workers. 62

Between 1970 and 1974, the number of manufacturing facilities in Ciudad Juárez grew from 22 to 89, with employment going from 3,165 to 17,484. Over the next two decades, the facilities in Ciudad Juárez grew to be larger-scale operations, with more employees per plant than those in other border cities. This meant that although there were fewer plants in Ciudad Juárez than Tijuana, the total number of maquiladora employees was higher in Ciudad Juárez by

62 Cañas and Coronado, “Maquiladora Industry: Past, Present, and Future.”
In terms of industrial firms, by 1995 more than 500 maquiladoras were operating in the Paso del Norte region. Ciudad Juárez had attracted 278 large maquilas, including General Electric, A.O. Smith, General Motors, Ford Motor Company, and Johnson & Johnson, which employed some 129,000 Mexican workers. In addition, about 2,000 administrators, managers, and engineers commuted from El Paso to Ciudad Juárez on a daily basis. There were also 72 Fortune 500 companies located in El Paso, manufacturing products including apparel, leather, food, electronics, and plastic component parts.64

It is also important to note that in the early stages of the BIP, 80 to 85 percent of these new job opportunities were largely afforded to women, who were considered more dexterous and adaptable to the nature of assembly work. For many former Braceros and other unemployed male migrants in Mexican border communities, the BIP did not produce the intended outcomes.65 This gender imbalance persisted through the first 15 years of the maquiladora industry - the most labor-intensive phase. Beginning in the 1980s, automated production and technology applications reshaped the industry and more male employees joined the ranks of the maquiladoras.66

By 1980, maquiladora employment had reached 120,000. During the next decade, the maquiladora industry entered a period of accelerated growth. This growth spurt started with the 1982 Mexican peso devaluation, which had the effect of substantially reducing operating costs for foreign-owned manufacturers (whose budgets were set in U.S. dollars but who paid costs in pesos). The trade environment in Mexico was also altered when it joined the General Agreement

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65 Martinez, Border Boom Town, 132.
on Tariffs and Trade (GATT) in 1986, opening the country to trade with countries other than the U.S. In doing so, Mexico relaxed more than four decades of protectionist and antitrade policies that were characteristic of the Import Substitution Industrialization (ISI) model that the country adopted in the 1940s. Tariff rates in Mexico fell from 60 percent to 15 percent by 1990, attracting more foreign companies – including Asian and European firms - to begin manufacturing operations along the border. Maquiladora employment grew at an annual rate of 19.2 percent between 1983 and 1989.

The aperture of Mexico to foreign trade and foreign investment continued during the 1990s. In 1992, Mexico entered into a free trade agreement with Chile. The following year, it joined the Asia-Pacific Economic Cooperation. Between 1990 and 1994, maquiladora employment grew at an average annual rate of 6.3 percent. In 1994, Mexico, the U.S. and Canada signed the North American Free Trade Agreement, creating a trading block intended to enhance competitiveness vis-à-vis European and Asian trading blocks. A combination of the NAFTA and a peso devaluation in 1994 resulted in another surge in maquiladora growth. This time, as a result of NAFTA provisions that opened tariff-free manufacturing to the entire country, U.S. companies were able to establish manufacturing facilities beyond the border. Between 1995 and 2001, maquiladora employment grew at an annual rate of 11 percent – employment in this industry was 1.3 million, a 300-fold increase since 1967. By 2000, despite

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67 Haber, Paul Lawrence, "Import Substitution Industrialization (Isi)." Encyclopedia of Mexico: History, Society & Culture, ed. Michael S. Werner (Routledge, 1998). http://0-search.credoreference.com.lib.utep.edu/content/entry/routmex/import_substitution_industrialization_isi/0?institution ld=9821, (accessed: January 18, 2020). According to Haber, the collapse of global markets between 1929 and 1932 forced Latin American countries that had been reliant on an export-import economic model to develop their own industrial capabilities focused on meeting domestic demand. The ISI model, adopted throughout Latin America, consisted of policies that protected “infant industries” from competition from established or “adult” international firms. The so-called Mexican Miracle, when the economy grew an average of 6.5 percent per year between 1940 and 1970, is often cited as a success of ISI.

68 Cañas and Coronado, “Maquiladora Industry: Past, Present, and Future.”
NAFTA provisions, 77 percent of that employment was still concentrated in Mexican border states.69

A critical component of the NAFTA negotiations that was as significant to the border region as the treaty itself was the establishment of the environmental and labor side agreements. Activists and grassroots organizations throughout the North American continent mobilized to block passage of the trade agreement, citing among many concerns, the widespread environmental degradation and labor exploitation that occurred along the U.S./Mexico border as a result of the BIP and the maquiladora-related industrialization.70 While the involvement of civil society in the trade policy debates did not result in the blockage of the NAFTA, it was instrumental in raising the profile of environmental concerns faced by residents along the U.S./Mexico border.71

Ultimately, these environmental and labor coalitions helped pave the way for the creation of the NAFTA side agreements – the North American Agreement on Environmental Cooperation (NAAEC) and the North American Agreement on Labor Cooperation (NAALC) – which provide an official tri-national infrastructure for denouncing labor and environmental violations.72 The NAAEC called for the creation of two critical institutions – the Border Environment Cooperation Commission (BECC) and the North American Development Bank (NADB). The BECC was created to assist states, municipalities, public entities, and private investors with the development

69 Cañas and Coronado, “Maquiladora Industry: Past, Present, and Future.”
71 Jan Aart Scholte, “Civil Society and Democracy in Global Governance,” in Civil Society and Global Finance, ed. J.A. Scholte and A. Schnabel (New York:Routledge, 2002), 11-32. “Civil Society” is defined by Jan Aart Scholte as “a political space where voluntary associations explicitly seek to shape the rules (in terms of specific policies, wider norms, and deeper social structures) that govern one or other aspect of social life.”
of environmental infrastructure, including water, wastewater, solid waste, and air quality projects. Their mandate was to provide the technical assistance and project certification that would prepare projects for financing through the NADB. The NADB in turn was charged with working with project stakeholders to identify project financing through a combination of loans and grants funded by the federal governments of both countries. The record for the effectiveness of these institutions is mixed, with criticism focused on the lack of authority and insufficient funding to address their mission.  

EFFECTS OF MASS MIGRATION AND URBANIZATION IN CIUDAD JUÁREZ AND EL PASO

For decades, residents of the border region have been compelled to adapt to the economic policies and geopolitical developments described above. The period between 1940 and 2000 was transformational for the region in terms of industrialization, physical footprint, and population expansion. Not surprisingly given the aforementioned economic policies, that transformation was much more acutely manifested in Ciudad Juárez than in the City of El Paso. Figure 4 illustrates the comparative growth in this border population. While this section considers growth in population on both sides of the border, it focuses primarily on Ciudad Juárez because of the dramatic changes that occurred over the course of these sixty years.


Beginning with the waves of migrants prompted by the Bracero Program and continuing through the BIP and then NAFTA, Ciudad Juárez experienced a population growth rate that exceeded 450% between 1950 and 1990 - ballooning from approximately 122,000 to 800,000 in 40 years. While a fraction of this massive population increase was the result of natural growth, the vast majority was driven by a large flow of migrants from the interior of Mexico who were searching for employment opportunities. Utilizing a base year of 1940 with a population of 48,881, the chart above provides a graphic depiction of the population surge to over 1.2 million by 2000.

To put Ciudad Juárez’s population growth within a state-level context for comparison, it is
telling to look at the border state of Chihuahua and the central state of Zacatecas. The state of
Chihuahua, where Ciudad Juárez is located, was growing at an accelerated rate as a result of
migrant influx while the state of Zacatecas was growing very slowly and residents were leaving.
These two states had a very similar population size in 1940, but the difference in growth
trajectories over 60 years can be assessed from the figure above.\footnote{Ibid.}

Beginning in the late 1940s, the growing population of Ciudad Juárez encountered
significant challenges in accessing safe drinking water, securing adequate housing, finding
schools for their children, and any number of other basic services. Local newspapers reported
horrific conditions due to the total absence of water for basic necessities in some areas. In July
1953, the newspaper *El Fronterizo* reported that three quarters of the city lacked drinking water
and sewage services – a condition that they presumed had precipitated the death of four hundred
children during a three-month period. Municipal authorities worked to dig wells and extend

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure.png}
\caption{Chihuahua/Zacatecas Comparative Growth}
\end{figure}
water services, but their progress in reaching a larger percentage of the population was stunted by the continuous flow of migrants into the city and an increasing demand for water. At this time, migrants were flowing into Ciudad Juárez from the north as well as from the south, as U.S. immigration officials dumped thousands of deportees at the border as a result of Operation Wetback.\textsuperscript{78}

In addition to water shortages, officials contended with the mushrooming of \textit{colonias populares}, unplanned and undeveloped squatter enclaves consisting of shacks without basic services. These \textit{colonias} emerged in outlying areas of the city, creating dangerous and unhealthy conditions for its residents given the lack of water, transportation, communication, and law enforcement infrastructure and capacity. By 1953, more than 12,000 children were unable to attend school due to the shortage of classrooms and teachers. The desperation of the migrants and the officials attempting to provide them with adequate services is captured by Mayor Rene Mascareñas Miranda’s address as he left office in 1959:

\begin{quote}
Migrants arrive in the northern ports in search of a better way of life, thinking that extraordinary employment opportunities exist in these border cities or having high hopes of earning dollars in the United States. When they cannot achieve their goals, and without an immediate possibility of returning to their places of origin, they give rise to problems of housing, law enforcement, health, diet, education, and employment. These problems are of serious proportions for local authorities. At the same time, municipal revenues fail to increase at the rate of demand for public services because the income level of the great majority of these families barely allows for the satisfaction of basic needs, and they are unable to contribute toward public expenditures. Then, the municipality does not have its own sources of income in proportion to the tasks and responsibility it is obliged to carry out.\textsuperscript{79}
\end{quote}

These desperate living conditions would persist as migrants continued to flow into the region through the 1960s. The population of Ciudad Juárez swelled from 270,279 in 1960 to over

\textsuperscript{78} Martinez, \textit{Border Boom Town}, 108, 113.  
\textsuperscript{79} Martinez, \textit{Border Boom Town}, 109.
424,000 in 1970, with the end of the *Bracero* program in 1964 and initiation of the BIP in 1965 serving as driving forces for this growth. By the 1980s, the nonnative population in Ciudad Juárez had reached 53 percent.  

Table 3 illustrates the percentage of households with sewage disposal – including public sewage and septic systems. From 1960 through 1970, about a third of the households had no sewage disposal. The proportion of households without something as basic as sewage service would continue virtually unchanged through 1990, when the population was approaching 800,000. These living conditions were consistent with the low-income levels that were promoted with the initiation of the BIP and which have persisted for decades. In 1995, 64.3 percent of the families in Ciudad Juárez lived on less than $2,710, placing them below the poverty level. Only 14 percent of the population earned more than $4,517.  

A study investigating the localized effects of globalization on Ciudad Juárez during the early 1990s examined the morphological and quality of life impacts of rapid urban growth on the city and its residents. The authors of this study found that the most significant period of territorial expansion coincided with the Bracero program and the BIP. During the years between 1940 and 1995, Ciudad Juárez expanded by over 15,000 hectares - growth that made the city’s footprint 28 times larger than it was before 1940. As the spatial expansion of industry and the population grew, it spread farther and farther away from the pre-industrial city center where public services and infrastructure were most developed. This also shifted the city into a new urban form with polycentric morphology and away from the monocentric form that dated back to the Spanish colonial era.\textsuperscript{83}

In order to assess the effects of the spatial dispersion of the residents of Ciudad Juárez, the authors developed a deprivation scale that considered a number of quality-of-life variables that included access to water, wastewater, schools, hospitals, retail establishments, police, paved roads, electricity, communication (telephone), and mass transportation. Using a neighborhood level unit of analysis utilized by the census, the authors found that the “highly developed” neighborhoods in the city were closest to the historic center and nearest the border. These were areas well developed prior to industrialization. Neighborhoods to the south and west of the city center that developed as industrialization was taking hold were considered “moderately deprived” and “more deprived.” The newest and most peripheral areas that were considered “highly deprived” were located in the far south, where the majority of the colonias populares were located. New settlements in the south and west that encroach on the skirts of the Sierra de Juárez were among the most deprived neighborhoods in the city, given the difficulty and expense

associated with providing services in sloped topography. In sum, this study concluded that the levels of deprivation experienced by residents of Ciudad Juárez worsened as development moved outward from the pre-industrial city center to the periphery. As such, they argued that residents of those peripheral neighborhoods felt the negative effects of globalization and industrialization more acutely than those in the pre-industrial city center.  

Indeed, the dramatic growth that resulted in countless unplanned housing developments lacking basic services also led to the development of a city roadway system that consisted of 3069 total kilometers, half of which were unpaved or unfinished. The prevalence of unpaved roads further diminished access to public safety and basic utility services. Homes built without gas or electric services were dependent on highly polluting wood-burning stoves for cooking and heating. In absence of solid waste disposal services, many burned their trash – creating unsafe and unhealthy conditions.  

Despite the extensive industrial presence and a population base that neared 1.2 million in 1997, the Ciudad Juárez municipal government struggled to meet with needs of its citizens with an annual budget of $53 million. For comparison, the annual budget of the City of El Paso that year was $411 million. With more than double El Paso’s population and a fraction of the operating budget, Ciudad Juárez had woefully insufficient resources to provide adequate public

86 U.S. Environmental Protection Agency, Environmental Plan for the Mexican-U.S. Border Area, 8.
infrastructure. One manifestation of this inadequate infrastructure is the capacity to provide street cleaning. While El Paso operated a fleet of 100 street sweepers, Ciudad Juárez had six.87

The City of El Paso was almost twice the size of Ciudad Juárez in 1940, but by 2000, Ciudad Juárez was more than twice as large as the City of El Paso. Although that relative population distribution reversed – especially after 1960 – El Paso also experienced challenges related to U.S./Mexico economic policies and the associated population growth, lagging incomes, and insufficient public infrastructure for a physically expanding city. During the course of six decades, the City of El Paso not only grew in population but also in its physical footprint. The table below maps the growth in land area of the city from 13.6 square miles in 1940 to 245.4 square miles in 1990, which paralleled the population growth from 98,810 to 515,342.88

87 Frank Clifford and Mary Beth Sheridan, “Borderline Efforts on Pollution,” Los Angeles Times, June 30, 1997. It is important to note that while the City of El Paso had a much larger budget than Ciudad Juárez, the City of El Paso also lagged in its public infrastructure as compared to other U.S. cities due to its depressed tax base and insufficient revenues. Median household incomes and related data for the City of El Paso are examined in the next section. As such, this comparison is between two resource-poor communities.

88 U.S. Census Bureau, “Population of the 100 Largest Cities and Other Urban Places In The United States: 1790 to 1990.”
Like most U.S. cities, the City of El Paso expanded its jurisdictional territory by means of annexation of surrounding unincorporated areas in anticipation of new economic development and population growth. The dramatic post-1970 land area growth coincided with the adoption of the BIP, which led to a significant expansion in the region’s manufacturing sector. Much like the growth experienced by its sister city, El Paso was now responsible for an expanded jurisdiction that required affordable housing and publicly-funded basic services, including paved roads, water/wastewater services, and first responders for the residents in this larger municipal footprint.89

The City of El Paso’s population surged by almost two hundred thousand residents between 1970 and 1990. Unfortunately, the incomes of these residents did not grow along with the size of the city. In 1975, per capita income in El Paso was $4335, lagging behind Texas per capita income, $5,705, by 24 percent. By the mid-1990s the per capita income of El Paso was

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only $13,702, lagging behind the U.S. at $23,196 and Texas at $21,118. Given the depressed incomes in the region and limited affordable housing options for low-income residents within the city, over seventy thousand people settled into unincorporated subdivisions with limited access to critical services including running water and paved roads. By 1996, there were 151 such unincorporated subdivisions, known as colonias, in El Paso County. As was the case with colonias populares in Ciudad Juárez, residents in El Paso County’s colonias also had diminished access to public safety and basic utility services. Most of these developments were located far from established water, waste water, and natural gas utility lines, making connection to these services cost prohibitive. Shanty homes often built with scrap materials had access to electricity but residents avoided expensive electricity services, instead utilizing highly polluting wood-burning stoves for cooking and heating. While some colonias had access to potable water, none had waste water services, creating unsanitary conditions for many residents. In absence of solid waste disposal services, many also burned their trash.90

Economic conditions for many El Pasoans worsened with the passage of NAFTA, as manufacturing jobs in the city migrated to Ciudad Juárez and eventually to other lower-wage markets in Central America and Asia. In 1992, over 20 percent of the jobs in El Paso County were in the manufacturing sector. In January 1994, shortly after NAFTA was ratified, there were approximately fifty thousand manufacturing jobs in El Paso – half of which were in the apparel and textile industry. By 2000, seventeen thousand manufacturing jobs, approximately 34 percent had been lost in NAFTA-related dislocations.91

91 Texas Centers for Economic and Enterprise Development, Paso del Norte Regional Economy: Socioeconomic Profile, 1-8. United States General Accounting Office, Trade Adjustment Assistance: Experience of Six Trade-
These dislocated workers, often with less than a high school education and limited English proficiency, struggled to transition from their manufacturing jobs to other employment opportunities that required English language proficiency and other post-secondary skill sets. For many, this transition meant losing employment at an hourly wage that was three to four times the minimum wage, plus benefits, with employers such as Levi-Strauss. The large volumes of displaced workers overwhelmed the federally-funded transitional retraining programs and few of the programs were bilingual. Many workers found themselves unable to progress beyond English proficiency classes and were therefore unemployable in an evolving job market.\textsuperscript{92}

**Conclusion**

For both Ciudad Juárez and El Paso, the years between 1940 and 2000 brought significant changes in population, urbanization, and infrastructure development. The economic agreements and treaties entered into by the U.S. and Mexico during this period resulted in growth and economic transitions that were unsustainable for the population and the resources of the region. The result was a binational community overwhelmed by mass migration, depressed wages, and a woefully insufficient public infrastructure that created unsafe and unhealthy living conditions for all of its residents. The following chapter explores the environmental and human health degradation that accompanied this economic transformation of the region.

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\textsuperscript{92} United States General Accounting Office, \textit{Trade Adjustment Assistance}, 59-60.
Chapter Two: Environmental and Human Health Fallout in the Paso del Norte

Invariably, economic growth and industrialization without proper public infrastructure and pollution controls comes at a cost to environmental and human health. This chapter examines the deterioration of air quality and the related human health issues that accompanied the region’s growth. It begins with some historical context for air pollution regulation in the United States and Mexico in order to understand how each country developed and amended regulatory frameworks during the twentieth century. By extension, it looks at how these frameworks were implemented along the border. It explores how air pollution was monitored and regulated in the Paso del Norte air basin, given the different regulatory regimes responsible for those activities. It also delves into the principal sources of air pollution in the region, specific pollutants that are major contributors to the air quality problems, and the human health effects of those pollutants. Finally, this chapter considers the development of the region and the accompanying environmental protections from the perspective of environmental justice and fractured governance in order to better understand how environmental regulatory regimes failed to protect the residents of this borderland.

Regulating Air Pollution in the United States and Mexico

Air pollution first became a source of widespread concern and federal government intervention in the United States in October of 1948 when the communities of Donora and Webster, Pennsylvania experienced a tragic smog-related event. Over the course of five days, the effluent produced by the American Steel and Wire Company and Donora Zinc Works along with local coal stoves and coke ovens combined with an unusual weather system and the mountainous river valley geography to create a temperature inversion that trapped a toxic layer
of air at 150 feet. As the air grew denser with smog and roads became impassible due to a lack of visibility, reports of respiratory distress became widespread. By the time the temperature inversion lifted, 20 residents had died, 1440 were seriously ill and another 4470 had mild to moderate respiratory symptoms – accounting for nearly half of the working-class population of the region.93

At the request of the local borough leaders, the United Steel Workers Union, the State of Pennsylvania and American Steel and Wire, the United States Public Health Service (USPHS) initiated the country’s first large scale epidemiological study conducted in response to an environmental health disaster. This USPHS study and subsequent investigations that looked at long term effects of exposure to lower levels of industrial pollutants served to reframe prevalent attitudes that had associated industrial air pollution with jobs and economic progress. Ultimately, this tragic event and the epidemiological findings that linked air pollution to serious human health issues became a critical catalyst for local, state, and federal level efforts to mitigate air pollution in the decades that followed.94 From the late 1940s until 1970, the number of states and local governments that enacted laws and ordinances to regulate air pollution from mobile and fixed sources accelerated dramatically.95

Although Donora brought air pollution into dramatic relief because of the scale of human fatalities and illness, it was soon overshadowed by the daily smog in the Los Angeles area that

94 Ibid.
95 Arthur C. Stern, “History of Air Pollution Legislation in the United States,” Journal of the Air Pollution Control Association 32, no.1 (1982): 44-61. Municipal legislative efforts to address smoke emissions began on a very limited scale between 1880 and 1890 (only 2 cities- Chicago, IL and Cincinnati, OH) and grew slowly during the first half of the twentieth century. By the 1950, 80 municipalities and two counties had enacted air pollution control legislation. By 1960, only eight states had enacted legislation to regulate air pollution.
was growing in intensity by the late 1940s and early 1950s. The California congressional delegation led the legislative charge to dedicate the resources of the federal government to the research and regulatory efforts that had been shouldered by state and local governments. The first advancement came in 1955 when Congress passed the Air Pollution Control Act (APCA), which gave the Public Health Service responsibility for assisting state and local air pollution control agencies with research, training, and technical assistance.  

There were several subsequent pieces of legislation that augmented the APCA, but none provided the resources or regulatory reach necessary to make significant changes. Then in the early 1960s, several critical events focused the public’s attention on environmental issues - among them were the 1962 publication of Rachel Carson’s *Silent Spring* and her congressional testimony, a smog-related environmental health disaster in London, a high-profile air pollution episode in Birmingham, Alabama, and a National Conference on Air Pollution that drew record attendance. By 1963, there was sufficient political momentum for Congress to pass the Clean Air Act (CAA), through which the federal government began to appropriate significant funding for air pollution control. The CAA created a regulatory structure that combined health-based and technology standards to achieve “safe” ambient air to the extent that it was technologically and economically feasible. It also provided federal grants to establish and improve state and local air pollution control programs, established a procedure to resolve interstate air pollution issues, and provided continuity for air pollution research.

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Despite these advances, pollution control across the United States was still woefully lacking. In an effort to build on the momentum of the early 1960s and “force this issue permanently onto the national political agenda,” U.S. Senator Gaylord Nelson of Wisconsin worked with environmental activists to organize the first Earth Day on April 22, 1970.99 Approximately twenty million Americans participated in demonstrations in cities across the country. This large-scale engagement of civil society indeed created the political momentum necessary to move Congress to authorize the U.S. Environmental Protection Agency in July 1970.100

A subsequent and truly significant breakthrough came when Congress passed the Clean Air Act Amendments that same year. Among the most important aspects of this legislation were that Congress mandated the EPA do the following: 1) set national air ambient air quality standards (NAAQS); 2) create stationary source emission standards; 3) allow for standards to be set for hazardous air pollutants (HAPs); 4) call for the regulation of fuel and fuel additives; and 4) require drastic reductions in automobile emissions. These were critical developments because they moved the country away from a patchwork of local and state regulations to a set of uniform federal standards that would become the basis for all air quality regulatory efforts in the United States. Based on air pollution monitoring data, EPA assigned states and regions therein NAAQS attainment or nonattainment status designations. Each state was required to develop its own state

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implementation plan (SIP) in order to meet federal mandates for mobile and stationary sources.\textsuperscript{101}

The EPA set NAAQS for certain pollutants – often referred to as criteria pollutants. For the period contemplated in this study, the EPA regulated six pollutants: suspended particulates, nitrogen dioxide, sulfur dioxide, ozone, carbon monoxide, and lead. Suspended particulates (referred to as total suspended particles or TSPs) are liquid or solid particles that remain airborne after being released by natural, agricultural, or industrial processes. TSPs cause and exacerbate respiratory and cardiovascular illnesses. Nitrogen dioxide is most commonly a byproduct of automobiles and coal-fired electric utilities. This pollutant aggravates cardiovascular and respiratory diseases, inhibits plant growth, and impairs visibility. Sulfur dioxide is a gas created in the combustion of fossil fuels and is a major cause of acid rain. Ozone is the product of a photochemical reaction that occurs when volatile organic compounds and nitrogen oxides are exposed to sunlight, and is a principal component of smog. Ozone gases are toxic, causing respiratory and cardiovascular diseases, impairing visibility, and damaging crops. Carbon monoxide is an odorless, colorless, poisonous gas that is generated primarily by motor vehicle emissions. This pollutant impairs the transmission of oxygen to vital organs and tissues, harms fetal development, and contributes to cardiovascular disease. Finally, lead is a naturally occurring element that is introduced into the air through fuel combustion and some industrial processes. High concentrations of lead in the body can impair bone growth, cause neurological disorders, and pose health risks for infants and fetuses.\textsuperscript{102}


\textsuperscript{102} Tabb, “Twenty-Five Years of the Clean Air Act in Perspective,” 14. A more detailed description of these criteria pollutants and their impact on human health is found later in this chapter.
The CAA was subsequently amended in 1977 and 1990, with provisions that had significant economic development repercussions for attainment and non-attainment areas alike. The 1977 amendment included provisions to prevent significant deterioration (PSD) of air quality in areas that already met or exceeded federal standards, utilizing emissions permits as a tool to limit new or modified major stationary sources. (This did nothing to curb the proliferation of numerous smaller emissions sources, which could be equally damaging.) Non-attainment areas were also at risk of losing federal highway funds for new road construction since new roadways would presumably contribute to emissions in the area. The 1990 amendment included Section 818, which provided relief for cities along the international border that could demonstrate that their emissions levels would meet federal standards but for emissions emanating from another country. I explore the relevance of these provisions to this study later in this chapter.\textsuperscript{103}

Another noteworthy amendment to the CAA in 1990 was that Congress expanded the list of regulated air pollutants to include 189 new chemical compounds known as Hazardous Air Pollutants (HAPs). These HAPs range from hydrocarbons and fibers to heavy metals – including substances such as benzene and asbestos. HAPs have deleterious effects on human health, causing cancer, immune system dysfunction, and harm to the neurological and reproductive systems. Some HAPs are also associated with respiratory and developmental problems. The presence of particulate matter further intensifies the dangerous health effects of HAPs. Particulate matter, especially PM\textsubscript{10}, can assimilate chemical contaminants on irregular surfaces or within porous interiors and become a vehicle for transporting HAPs into the lungs. Once inside

\textsuperscript{103} Tabb, “Twenty-Five Years of the Clean Air Act in Perspective,” 14. U.S. Clean Air Act Amendments of 1990, S. 1630, 101\textsuperscript{st} Congress, 11/15/90. https://www.congress.gov/bill/101st-congress/senate-bill/1630/text (accessed February 1, 2020). There have been numerous amendments to the CAA. I focus on the 1977 and 1990 amendments because they are particularly relevant to this study.
the lungs, HAPs can enter the bloodstream and damage the body’s organs. Given the dangerous nature of these compounds and the opportunistic interaction with other pollutants, this regulatory addition to the CAA was critical to the protection of human health.104

In Mexico, concerns regarding air pollution first appeared in the legal code in 1928 as a matter of private law, specifically relating to the construction of chimneys on private property and the distance required from adjacent properties. This was intended to address the proliferation of chimneys and the density of chimney smoke, which was a significant source of air pollution. In 1940, the federal government enacted regulations on minimum height requirements for chimneys and pollutant concentrations. However, it was not until 1971 that Mexico enacted comprehensive legislation to control and prevent pollution.105

The primary impetus for this legislative action was the severe air pollution plaguing Mexico City. In the two decades leading up to this legislative action, Mexico City’s population had ballooned more than 400 percent, to 8.3 million inhabitants. The Valley of Mexico also housed 50 percent of the country’s industrial production. All of this anthropogenic activity was taking place within a topographic bowl surrounded by volcano ridges. These emissions must rise to 9100 feet in order to be able escape through a narrow pass called Milpa Alta, located southeast of the population center. The emissions from domestic sources, motor vehicles, and industrial operations combined with geographic and meteorological factors to create temperature inversions that trapped pollutants in this valley for extended periods of time.106

In 1968, the Mexican Institute of Chemical Engineers held *El Primer Simposium Sobre La Contaminación De Aire En la Ciudad De México* in response to the rapidly deteriorating air quality in Mexico City. By the 1950s, this city built on a desiccated lakebed was subject to raging dust storms and effectively unregulated emissions driven by the import substitution industrialization of the 1940s. Concerns over air quality permeated beyond scientific circles, appearing in political discourse as well. An article published in 1971 in the official magazine of Mexico’s ruling party described the Valley of Mexico as “grey and opaque, surrounded by industrial centers and polluted by dust storms, carbon monoxide, sulfur dioxide, nitrogen oxides, particles of asbestos and rubber.”

Beyond Mexico City, the United Nations and other multinational coalitions were promulgating international accords to address the environmental crisis unfolding around the world. Mexican officials considered the environmental laws of the U.S., Canada, West Germany and several other countries in order to develop legislation for the Mexican legal framework. In the ensuing years, international treaties would become the foundation for Mexico’s environmental laws, including the Declaration of the United Nations Conference on the Human Environment in 1972 and the United Nations Framework Convention on Climate Change in 1992. Mexico’s 1971 legislative initiative consisted of three constitutional reforms intended to address several public health issues, namely the use and sale of alcohol, narcotics and other degenerative substances, and environmental pollution, by expanding the powers of the *Consejo de Salubridad* (Council on Health). The amendment of Article 73 of the Mexican Constitution

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charged the *Consejo de Salubridad* with developing a program and legal system for addressing environmental pollution. In addition, the Mexican Congress enacted the *Ley Federal Para Prevenir y Controlar la Contaminación Ambiental* (Federal Law for the Prevention and Control of Environmental Contamination). Commentary published from the congressional deliberations indicates that these legislative actions were taken in order to move away from failed piecemeal efforts and enable a comprehensive and centralized approach to dealing with environmental pollutants and polluting activities which degrade ecological systems.¹⁰⁹

The *Ley Federal Para Prevenir y Controlar la Contaminacion Ambiental* specified that the federal executive would create regulations to control emission and protect air, water, and soil from contamination. Subsequent legislation and regulations in 1973, 1982, and 1983 were aimed at reducing industrial pollutants and establishing national norms for pollutants in order to conserve, protect, and restore the environment. However, despite these legislative efforts the regulatory reach and enforcement of the federal government was limited outside of the Mexico City metropolitan area. To address that limitation, in 1987 the Mexican Congress once again amended the Constitution thereby enabling concurrent jurisdictions for federal and local governments for the purposes of environmental protection. This led to the 1988 passage of the *Ley General de Equilibrio Ecológico y Protección al Ambiente* through which individual states and local governments could enact environmental laws and create enforcement mechanisms for both fixed and mobile sources.¹¹⁰

In 1993, Mexico adopted the *Normas Oficiales Mexicanas* (NOMs) which set the emissions standards for measuring concentrations of certain contaminants. These included ozone, nitrogen dioxide, sulfur dioxide, carbon monoxide, and particulate matter. Like the NAAQS in the U.S., the NOMs were intended to provide a metric by which to determine air quality as recorded by air monitoring stations throughout the country. If the readings of air monitoring stations exceeded the NOMs for individual contaminants, an area would be considered in violation of air quality standards and be subject to develop a plan for remediation that would be developed by state and local governments.\(^\text{111}\)

It is important to understand the development of these national air quality standards during the 1960s and 1970s because just as these protections were being promulgated in the U.S. (and to a much lesser extent in Mexico), the BIP was enabling the rapid industrialization of the border region. Hundreds of American-owned companies were establishing operations along the Mexican side of the border where air quality regulatory mechanisms were lacking until the early 1990s, along with their twin plants on the U.S. side of the border.\(^\text{112}\) The following section explores how this dynamic of industrial growth and urbanization coupled with decades of an absent air quality regulatory regime played out in communities along the border generally and in the Paso del Norte region specifically.

**ENVIRONMENTAL FALL-OUT IN MAQUILADORA BOOM TOWNS**

Consistent with the growth in the *Bracero* Program and later the BIP and NAFTA, urban border communities became home to hundreds of thousands of migrants who relocated from


\(^{112}\) Cañas and Coronado, “Maquiladora Industry: Past, Present, and Future.”
central and southern Mexico in order to avail themselves of employment opportunities in the U.S. and in the maquiladoras. During the 1940s and 1950s, the largest surges in population were felt in the states of Chihuahua, Nuevo Leon, and Sonora as a result of Bracero-related migration and the location of processing centers for those migrants. By the 1970s and 1980s, the expansion in the maquiladora industry would bring population growth to all Mexican border states.\textsuperscript{113} The dramatic population increases seen in urban centers like Ciudad Juárez strained every aspect of public infrastructure – roads, drinking water, electric/gas services, wastewater treatment facilities, housing, solid waste disposal, and public transportation. Communities that did not have wastewater treatment facilities had no way of managing the volumes of household and industrial (hazardous) wastewater other than to dump it into nearby streams, rivers, and oceans. Unplanned housing developments dependent on unpaved roads introduced unhealthy levels of particulate matter into the air. The population boom took an equally deleterious toll on the region’s environment and the health of border residents\textsuperscript{114}

By 1989, the U.S. Environmental Protection Agency (EPA) was monitoring 145 industrial facilities on the U.S. side of the border and reported the release of about 32.5 million tons of toxic chemicals into the air, water, or land that year. These industrial facilities were largely the twin plants associated with a Mexican maquiladora. At that time, EPA’s Mexican counterpart, the Secretaría de Desarrollo Urbano y Ecología (SEDUE), lacked the resources or capabilities to conduct similar environmental monitoring for industries in Mexico, so the full extent of environmental pollution due to releases of toxic chemicals in the border region is unknown. In addition to the pollution produced by the facilities themselves, there was a

\textsuperscript{113} Esparza, Waldorf, and Chavez “Localized Effects of Globalization,” 125, 126.
\textsuperscript{114} U.S. Environmental Protection Agency, \textit{Environmental Plan for the Mexican-U.S. Border Area}, 8.
tremendous amount of pollution introduced into the environment by the idling semi-trucks awaiting inspection of maquiladora-produced goods at the international ports of entry for hours at a time.\textsuperscript{115}

The acceleration of trade between the U.S. and Mexico continued throughout the 1990s, expanding from BIP-related trade into unprecedented volumes enabled by NAFTA. That two-way trade soared from US$65.1 billion in 1991 to US$160 billion in 1998.\textsuperscript{116} By 1996, two years after NAFTA initiated, 3,254,084 semi-trucks idled at ports of entry all along the southern border awaiting entry into the U.S.\textsuperscript{117} Everyday, these idling trucks spewed diesel emissions and related particulate matter containing endocrine disrupting chemicals (ERC) into the neighborhoods that surrounded the ports of entry.\textsuperscript{118}

In many border communities, the industrial facilities responsible for the cargo carried by those trucks were also contaminating the environment, with tragic human health consequences. In communities from Tijuana, Baja California Norte to Brownsville, Texas, health authorities identified clusters of rare and often fatal neural tube birth defects. These clusters were located in close proximity to industrial facilities that released toxic chemicals into the air or nearby waterways. Without adequate environmental regulatory enforcement, multinational corporations responsible for the contamination escaped accountability.\textsuperscript{119}

\begin{footnotes}
\item[115] Ibid.
\end{footnotes}
AIR QUALITY IN THE PASO DEL NORTE REGION

As with the rest of the border region, the existence of the CAA and the adoption of the NOMs did not mean that there was a robust environmental protection apparatus operating in the jurisdictions within the Paso del Norte. It would take decades for the governing entities in the region to develop air monitoring networks, regulatory enforcement, and comprehensive reporting of air quality. It would also take some time and significant cross-jurisdictional collaboration to tie those efforts together and have the data necessary to inform an effective air quality control strategy for the air basin.120

In 1972, Texas developed its first “Implementation Plan For Attaining National Ambient Air Quality Standards,” commonly referred to as a state implementation plan (SIP), as required by the 1970 amendment to the Clean Air Act. In that SIP, Texas provided a description for Region 11, a six county area covering the westernmost part of the state including El Paso County. (See figure below.) For El Paso County, the SIP reported a population of 359,291. However, it stated that given the proximity to Ciudad Juárez and its estimated population of 400,000, the region should be considered a single metropolitan area of 800,000 for purposes of air pollution control. It described the region as being traversed by the eastern range of the Rocky Mountains, with at least seven peaks with an altitude of 8000 feet or higher, and numerous peaks exceeding 7000 feet. In addition to providing demographic, climatic, and geographic characteristics for the six county region, the SIP also projected moderate population and industrial growth in El Paso County that was expected to affect the air quality of the region.121

The SIP stated that the “only major influx of industry that could possibly affect air quality” was the development of a large sulfuric acid plant that was under construction. Although the SIP did not specifically name ASARCO, the smelter was actively working on strategies to mitigate sulfur dioxide emissions, including erecting taller smoke stacks and converting sulfur-dioxide by-products into marketable commodities such as elemental sulfur and sulfuric acid. The SIP then stated that adherence to existing and proposed Texas Air Control Board Regulations “should provide adequate control of air pollution within the region.” The SIP went on to identify that the major air pollution problems in the region were “the control of sulfur compounds from metal

122 Perales, Smeltertown, 236.
smelting; particulates from cotton gins, cement plants, asphalt batching plants, and automotive emissions in El Paso.” It clearly identified the major pollution sources in El Paso but characterized them as manageable so long as polluters adhered to the Texas Air Control Board regulations. Of note, although the SIP stated that El Paso and Ciudad Juárez “must be considered a single metropolitan area” for the purposes of air pollution control, it made no mention of Ciudad Juárez in its assessment of pollution sources in the region.123

ASARCO

Oddly, the 1972 SIP does not mention that by 1970, the City of El Paso, the State of Texas, the Texas Air Control Board and the Centers for Disease Control filed suit against ASARCO for violating the 1967 Air Safety Code. ASARCO was processing copper, lead, zinc, and other ores in an area surrounded by residential neighborhoods on either side of the border. The smelting resulted in the release of air emissions that contained toxic byproducts such as lead, sulfur, arsenic, and cadmium. Local and state authorities initiated the legal battle after health officials found that 43 percent of the people living within 1.6 kilometers of the smelter exhibited lead blood levels in excess of the limit of 40 micrograms per 100 milliliters. Over 100 children from the surrounding community had abnormal and potentially life threatening levels of lead in their blood, according to the health screenings.124

In an effort to quantify the pollutants that ASARCO was emitting, the City of El Paso Department of Health utilized a series of air samples. According to the Centers for Disease Control, the air sample testing revealed that ASARCO “had emitted more than 1000 tons of lead, 560 tons of zinc, 12 tons of cadmium and over 1 ton of arsenic into the atmosphere” between 1969 and

124 Perales, Smeltiertown, 226.
By 1972, concerns regarding the amount of lead contamination in the soil of properties surrounding the smelter led City of El Paso political and health officials to recommend the relocation of all residents of the community known as Smeltertown, a company town adjacent to the smelter that ASARCO built in the late 1880s. By early 1973, Smeltertown’s property owners evicted residents from their homes.126

ASARCO would continue to operate and emit toxins into the environment for more almost three decades following this legal battle with the City of El Paso and the State of Texas. According to the U.S. EPA’s Toxic Release Inventory, a database of estimated emissions reported by major industries, ASARCO reported over 600 tons of toxic chemicals into the air between 1990 and

1996. This included over 41 tons of arsenic, 7.2 tons of cadmium, 50.8 tons of lead, and 52.6 tons of sulfur dioxide. A 1997 study of children living in Anapra, Mexico, within one mile of the ASARCO El Paso smelter, produced similar findings to the study conducted in Smeltertown in the early 1970s. Researchers found elevated blood lead levels in almost half of the children tested and lead levels in surface soil was seven times higher than the standard.127

However, the emissions inventory reports to the TRI provided an incomplete and inaccurate picture of ASARCO’s actual emissions profile. Those reports did not account for the illegal hazardous waste that ASARCO’s El Paso smelter received between 1992 and 1997 from the ASARCO-subsidiary Encycle - a waste management company contracted by the state of Colorado to treat and dispose of highly corrosive and toxic waste from the U.S. Department of Defense’s Rocky Mountain Arsenal. Beginning in 1992, the El Paso smelter ramped up operations to blend the Encycle waste with the copper concentrate, especially during the night shifts when smoke stack emissions could not be seen or when winds were blowing pollutants toward Ciudad Juárez. The Encycle waste was treated like copper ore, despite the fact that it was hazardous waste (likely pyridine and tetrachloroethylene) and not metal waste that could be recycled. This illegal incineration of hazardous chemicals via ASARCO’s El Paso smelter continued until 1997, when the U.S. EPA and the Texas Natural Resources Conversation Commission (TNRCC) finally investigated the Encycle/ASARCO illegal operations. According to El Paso State Senator Eliot Shapleigh and U.S. Congressman Silvestre Reyes, more than 5000 tons of hazardous waste, including more than 300 tons of chemical warfare agents from the Rocky Mountain Arsenal, were incinerated in El Paso.128

127 Hampton and Ontiveros, *Copper Stain*, 84-85, 89.
Despite ASARCO’s efforts to obscure its emissions, a study conducted in 1995 clearly connected arsenic emissions in the region to ASARCO. The 1995 Texas Center for Policy Studies publication, the *Texas Environmental Almanac* documented a special purpose air monitoring study conducted by the TNRCC in 1993 in El Paso following findings of high arsenic levels in ambient air analyses. The study site was Vilas Elementary School, located approximately two miles from ASARCO. The study results indicated that arsenic readings consistently exceeded the annual and 24-hour screening levels. By comparing this monitoring data to data gathered in 1980 when ASARCO was shut down due to a strike, the TNRCC was able to conclude that ASARCO’s smelting activity was responsible for the elevated arsenic levels in the air. During a subsequent permit hearing, ASARCO agreed to reduce its arsenic emissions by a factor of ten in order to secure a permit renewal.¹²⁹

ASARCO’s El Paso smelter operations continued until 1999, when depressed global copper prices forced the company to place the smelter in “care and maintenance” status. This dormant status allowed ASARCO to shut down operations without triggering remediation action on the contaminated site that would have been required following a complete closure. In 2008, while the company was navigating bankruptcy proceedings, the Texas Commission on Environmental Quality (TCEQ, formally TNRCC) granted ASARCO an emissions permit renewal for the El Paso smelter, despite widespread community opposition. The same permit renewal request was subsequently denied by the U.S. EPA in February 2009. Immediately thereafter, ASARCO decommissioned the El Paso smelter.¹³⁰

¹³⁰ Hampton and Ontiveros, *Copper Stain*, 18-19, 163.
BEYOND ASARCO

Although ASARCO was a notorious and destructive industrial polluter in the region, it was certainly not the only source of air pollution contributing to the air quality issues in the Paso del Norte air basin. A precise assessment of the region’s air quality is difficult to determine for the period from the 1970s through the late 1980s due to the complete absence of air monitoring stations in Ciudad Juárez. In 1989, U.S. EPA and the Mexican Secretaria de Desarrollo Social collaborated to install and operate the first monitors in Ciudad Juárez. Additional monitors were installed in 1993 and 1996 to enable monitoring of ozone, PM-10 and CO. However, because this border community shares an air basin in which air currents travel without regard to political boundaries, it can be assumed that the air pollution levels recorded in El Paso County and Southern Doña Ana County were indicative of air pollution levels throughout the Paso del Norte Region. This assumption is also consistent with the 1972 Texas SIP, examined earlier, which stated that El Paso and Ciudad Juárez “must be considered a single metropolitan area” for purposes of air quality.

Throughout the 1970s and 1980s the U.S. EPA began to designate attainment status for the National Ambient Air Quality Standards in areas throughout the country. Those designations are recorded in the U.S. EPA Green Book – with the initial year of status designation correlating to the year a particular NAAQS standard was implemented. The Green Book indicates that El Paso County was designated to be in moderate non-attainment for carbon monoxide in 1971. El Paso County was the only Texas county listed in non-attainment for carbon monoxide that year. It was also listed as in serious non-attainment for the one-hour ozone standard in 1979 and moderate non-

\[131\] INE/SEMARNAP, Primer Informe Sobre la Calidad del Aire en Ciudades Mexicanas, 57. Copy with Author. This report indicates that the monitoring stations were operated by the Municipio de Ciudad Juárez in 1996, but according to Jesus Reynoso, three of the air quality monitoring stations were still managed by the El Paso City County Health and Environmental District in 1998. Jesus Reynoso, El Paso City County Health and Environmental District’s environmental health program manager, interview by author, February 16, 1998, El Paso, Texas.

attainment for particulate matter (PM 10) in 1987. Southern Doña Ana County is listed as a non-
attainment area for certain criteria pollutants. Specifically, Anthony, NM is listed continuously as
a moderate non-attainment area for PM 10 beginning in 1987. The Sunland Park, NM area is listed
as being in marginal non-attainment for the one-hour ozone standard beginning in 1995.133

With the implementation of the 1990 amendments to the CAA, the EPA designated El Paso a
serious non-attainment area for ground level ozone, and a moderate non-attainment area for carbon
monoxide and particulate matter.134 By the early 1990s, the U.S. Environmental Protection Agency
reported that the El Paso/Ciudad Juárez sister cities had the worst air quality along the 2,000 miles
of border. At that time, El Paso had the worst air pollution in Texas and ranked among the ten most
polluted cities in the United States.135 With the availability of comprehensive air pollution data for
Ciudad Juárez for 1996, it is known that the city exceeded Mexican NOMs on 28 days, 15 days
due to ozone exceedances, 13 days due to PM-10 exceedances, and one day due to carbon
monoxide exceedances.136 A study conducted by Mexican authorities revealed that Ciudad Juárez
ranked second among Mexican cities, behind only Mexico City, in emissions produced by mobile
sources.137

While the air pollution monitoring data from both U.S. and Mexican regulators pointed to
exceedances for several criteria pollutants in the region, it is useful to understand what that

133 United States Environmental Protection Agency, *Green Book*,
https://www3.epa.gov/airquality/greenbook/anayo_tx.html,
designations for carbon monoxide are first reported in the Green Book for 1971; particulate matter designations are
first reported for 1987; and ozone one-hour standard designations are first reported for 1979.
134 Jesus J. Reynoso, Air Quality Program Manager, El Paso City-County Health & Environmental District.
Copy with author.
135 Paso del Norte Air Quality Task Force, “Solving the Air Pollution Problems in Paso del Norte,” El Paso,
meant for the health of the region’s residents. The U.S. EPA utilizes an annual air quality index (AQI) to categorize air quality based on the measured levels of criteria air pollutants within a geographic area. The AQI uses the following descriptions to relate daily air monitoring data to the effects of air pollution on human health over the course of a year: good days, moderate days, unhealthy for sensitive groups days, unhealthy days, very unhealthy days, and hazardous days. The bar chart below provides the number of days in each category for the El Paso metropolitan area (zero hazardous days were observed). Of note is the number of days classified as “unhealthy days” or “unhealthy for sensitive groups days.” During 1980 there were 132 days in one of those two “unhealthy” classifications – slightly more than a third of the year. By 1985 that number rose to 248 days, with 138 of those days deemed unhealthy for the entire population. That is to say that the region was living with air considered unhealthy for over two thirds of the year. By 1990, there were still more days in some unhealthy classification than those considered moderate or good days. 138

Table 5. U.S. EPA Annual Air Quality Index for El Paso Metropolitan Area

<table>
<thead>
<tr>
<th>Year</th>
<th>Good Days</th>
<th>Moderate Days</th>
<th>Unhealthy for Sensitive Groups Days</th>
<th>Unhealthy Days</th>
<th>Very Unhealthy Days</th>
</tr>
</thead>
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<tr>
<td>2000</td>
<td>114</td>
<td>210</td>
<td>40</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td>66</td>
<td>191</td>
<td>91</td>
<td>174</td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>67</td>
<td>102</td>
<td>128</td>
<td>68</td>
<td></td>
</tr>
<tr>
<td>1985</td>
<td>38</td>
<td>110</td>
<td>138</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>67</td>
<td>147</td>
<td>104</td>
<td>28</td>
<td></td>
</tr>
</tbody>
</table>

**Non-Attainment for Criteria Pollutants**

As noted earlier, El Paso County and Doña Ana County were in non-attainment of the NAAQS for certain criteria pollutants beginning in the 1970s, continuing through the 1990s. Ciudad Juárez was also out of compliance with the NOMs during the 1990s, when monitoring began there. In order to better understand the criteria pollutants that exceeded air quality standards in the region (ground level ozone, PM 10, and CO) and the pollution sources that contributed to those exceedances, it is necessary to examine each pollutant as it was manifested in the Paso del Norte air basin. Below is a brief description of the three pollutants and the main sources for these pollutants.\(^{139}\)

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\(^{139}\) For the purposes of this study, I am focusing on the criteria pollutants that have exceeded air quality standards. These are pollutants for which official air quality monitoring data is available – albeit to a limited degree for Ciudad Juárez.
Ground level ozone (O₃) is a photochemical compound that results from the reaction between three key ingredients: sunlight, nitrogen oxides, and volatile organic compounds. Combustion mechanisms such as boilers, heaters, incinerators, and engines commonly produce nitrogen oxides (NOₓ). Volatile organic compounds (VOCs) are emitted from hundreds of sources, but the most common sources are gasoline loading terminals, gas stations, dry cleaners, and automotive body shops. The presence of these chemicals in conjunction with light winds, sparse cloud cover, heat, and plenty of sunlight, provides the perfect conditions for the formation of ground level ozone, a major component in urban smog. Ozone is a very unstable contaminant that decomposes just as easily as it forms.¹⁴⁰ This type of ozone is unlike the stratospheric ozone which occurs 9 to 18 miles above us and which actually helps to protect the earth from harmful ultraviolet rays.¹⁴¹ During the 1990s, automobiles were responsible for approximately 58 percent of the ground level ozone in the region. Other contributors were paint and body shops that use paints, solvents, and thinners high in VOCs.¹⁴²

Carbon Monoxide (CO) is a colorless, odorless, poisonous gas that is the product of incomplete combustion of fossil fuels. Vehicle emissions were largely responsible for the production of carbon monoxide in the air basin during the mid to late 1990s, with local traffic and trade transports were responsible for 93 percent of the carbon monoxide in the air basin. The region had a large and old vehicle fleet consisting of over 360,000 vehicles in Ciudad Juárez, close to 300,000 in El Paso, and approximately 70,000 vehicles in Doña Ana County. In El Paso, 34 percent

of the vehicle fleet was over 10 years old, while 63 percent of the vehicles in Ciudad Juárez were over 10 years old. Given socioeconomic conditions, government officials suspected that the Doña Ana County fleet was similar to that of Ciudad Juárez.\textsuperscript{143} In the early 1990s, the majority of Ciudad Juárez’s public transport vehicles were 1979 models.\textsuperscript{144} Environmental officials estimated that El Paso and Ciudad Juárez contributed equally to the overall emissions of carbon monoxide because although vehicles in Ciudad Juárez were generally older and many lacked pollution control devices such as catalytic converters, El Paso vehicles were generally driven more miles by single occupants.\textsuperscript{145}

Particulate matter (PM-10), consists of inhalable particles that measure less than 10 microns in diameter. PM-10 is generated by natural sources such as soil, pollen, and dust storms. However, anthropogenic activities such as open burning, sandblasting, use of unpaved roads, construction, residential wood burning, quarries, and motor vehicle emissions contributed substantially to the PM levels in the region.\textsuperscript{146} Some PM-producing activities considered an integral part of everyday life included: agricultural burning and tilling, practiced extensively in the river valley prior to the planting season; open-air trash burning, a commonly used method of trash disposal in peripheral communities that are not serviced by municipal trash collection; and wood burning, used as a primary source of energy for food preparation and indoor heating in many underdeveloped areas in the region.\textsuperscript{147} In Ciudad Juárez, a significant source of particulate matter

\begin{flushleft}
\textsuperscript{145} Paso del Norte Air Quality Task Force, “Sharing a Common Airshed.”
\textsuperscript{146} Ibid.
\textsuperscript{147} Rincón, February 18, 1998.
\end{flushleft}
was the brick kiln industry, consisting of over 300 informal small businesses that produced bricks for the construction industry.\textsuperscript{148} In addition, throughout the 1990s Ciudad Juárez residents traversed the city on a transportation network that consisted of 1,480 kilometers of dust-producing unpaved roads – about 48 percent of the roadways.\textsuperscript{149} These and other sources combined in the air basin, resulting in health threatening levels of particulate matter.

**Health Consequences**

As was evident from the non-attainment designations on both sides of the border, each of the contaminants described above existed in levels considered unhealthy for Paso del Norte residents. Generally, adverse effects of air pollution include asthma and allergy attacks, irritation of the eyes, nose, and throat, and damage to the lungs.\textsuperscript{150} However, it is clear from numerous scientific studies and research publications that the effects of poor air quality manifest themselves throughout the human body – in cardiac, respiratory, reproductive, and neurological systems. For those border residents who live or work near high-traffic areas such as freeways and ports of entry, the health effects are more acute.\textsuperscript{151}

More specifically, the health effects of ground level ozone include increased incidences of respiratory diseases. People who suffer from lung diseases such as emphysema, bronchitis, pneumonia, asthma, and colds have more difficulties breathing when the levels of ozone in the air


\textsuperscript{150} Kirk P. Watson and Peter Emerson, “Border Towns Need Air Pollution Program.” *Austin American-Statesman* July 14, 1993.

are high.\textsuperscript{152} Other symptoms associated with ozone include shortness of breath, coughing, headaches, nausea, chest pains, and even permanent lung damage.\textsuperscript{153} A U.S. EPA study found that cases of asthma among children rose by 118 percent between 1980 and 1993, and it was the leading cause of child hospital admissions during the late 1990s. It was suspected that ozone pollution was the leading culprit in this alarming trend in the U.S. – a conclusion that can be extrapolated to the Paso del Norte Air Basin where ozone levels were also a concern.\textsuperscript{154}

Particulate matter is known to cause lung and respiratory tract irritation.\textsuperscript{155} Findings from a 1996 study conducted by the Natural Resources Defense Council show that the estimated annual cardiopulmonary deaths attributable to particulate air pollution in the El Paso metropolitan statistical area were 1,390 (for 1989).\textsuperscript{156} Particulate matter can be even more dangerous because it serves as transporter of endocrine disruptors and hazardous air pollutants such as benzene, asbestos, and other heavy metals, into the body. PM-10, characterized by irregular and porous surfaces, can assimilate and transport chemical contaminants known to have carcinogenic effects into the blood stream and organs via the lungs.\textsuperscript{157}

\textsuperscript{152} Texas Natural Resource Conservation Commission, "Ozone Action Days: Do Your Share for Cleaner Air, Ground Level Ozone and Health," Educational Leaflet. Copy with author.
\textsuperscript{153} Pam Reed, Texas Natural Resource Conservation Commission, "Austin Metropolitan Area Air Care: Summary Report." Copy with author.
\textsuperscript{154} Lee Simmons "Ozone at Lowest Level in 25 years, Still a Problem," \textit{The Daily Texan}, April 1, 1997.
\textsuperscript{155} Paso del Norte Air Quality Task Force, “Sharing a Common Airshed”.
\textsuperscript{156} Natural Resources Defense Council, "Breath Taking: Premature Mortality due to Particulate Air Pollution in 239 American Cities," May 1996, 70.
The high carbon monoxide levels in ambient air are known to cause dizziness, headaches, and chest pains. At low levels, carbon monoxide reduces oxygen levels in the bloodstream. A U.S. EPA study estimated that 40,000 Americans died prematurely each year from respiratory illnesses and heart attacks linked with air pollution, of which carbon monoxide is a major component. Again, many of these studies cite data for U.S. cities, the effects of these pollutants on people in Ciudad Juárez would be the same.

In addition to the commonly recognized effects of air pollution, researchers and public health officials have pinpointed very serious health impacts that extended to learning disabilities in school age children who are exposed to higher levels of air pollution by virtue of where they live and the proximity to pollution sources (like freeways, power plants, and industrial facilities). One study of fourth and fifth graders in El Paso Independent School District found a positive correlation between air toxins and academic performance, exposing a clear relationship between on-road mobile sources such as diesel transports and non-road mobile sources such as rail transports with lower grade point averages.

Other studies have found linkages between elevated levels of air pollution and increased risk of infant mortality. In 2002, the Commission for Environmental Cooperation of North

159 Simmons, "Ozone at Lowest Level in 25 years, Still a Problem."
America funded a study that examined the health effects of air pollution on children in Ciudad Juárez. Under the direction of Isabelle Romieu, a team of researchers looked at five years of data of mortality and emergency hospital visits for respiratory related illnesses for children ages 0 to 16. Researchers gathered emergency visit data from 1997 to 2001 for the two major hospitals within the Instituto Mexicano del Seguro Social, the public healthcare system that provides healthcare to approximately seventy percent of the population in Ciudad Juárez. They tracked emergency room visits related to upper-respiratory illness, lower respiratory illness, and asthma by age groups. For children ages 0-5 alone, they found 36,087 emergency room visits. They also gathered mortality data from the Health Ministry of Chihuahua, including variables such as age, cause of death, and zip code (to assist in determining socio-economic status). The researchers then took air pollution data from the Ciudad Juárez monitoring network system as well as air monitoring stations located along the border, on the U.S. side.

Applying a series of complex statistical analyses, researchers combed through the air pollution, climatic, and health data to assess whether the elevated levels of air pollutants such as ground-level ozone and fine particulate matter affected the respiratory health of children in Ciudad Juárez. Researchers found significant associations between elevated ozone ambient levels and emergency room visits for upper-respiratory illnesses and asthma in children of all ages. Children five years or less also experienced lower-respiratory illnesses in the days following elevated ambient ozone levels. With regard to mortality, the data suggested that elevated levels of particulate matter increased the risk of respiratory mortality among infants (1 month to 1 year old).

163 Romieu, et.al., Health Impacts, ii.
165 Romieu, et.al., Health Impacts, 3-5.
from lower socio-economic status. Vehicle exhaust and unpaved streets are leading sources of particulate matter in the air.166

The findings of this study provide yet another source of information that indicates the effects of air pollution on human health. In this case, we see the effects on the region’s youngest and most vulnerable residents. Given the nature of the region’s air basin and the pollution levels observed in this study, the conclusions regarding health effects on children can reasonably be applied to children living in similar conditions throughout the Paso del Norte region.167 These and other studies also point to the long-term ramifications of air pollution on the health and economic well-being of children in the region.168

ENVIRONMENTAL JUSTICE AND FRACTURED GOVERNANCE

Definitions of environmental justice vary broadly across communities and among environmental activists in the U.S. and globally. However, most definitions tend to focus on the unfair burden of environmental risk carried by communities of color and low-income communities. Historically, environmental justice movements in the U.S. have focused on the disparate development and enforcement of environmental laws and policies that has facilitated concentrations of highly polluting industries in working class communities.169 In Mexico and

166 Ibid, 3.
other parts of Latin America, environmental justice activists have been less focused on hazardous siting inequities and more rooted in popular mobilization for social justice. Meanwhile, at an international level, calls for environmental justice tended to focus on governmental policies that enable multinational corporations to exploit indigenous and low-income communities by externalizing the environmental costs of their production and exploiting lax environmental and labor protections.\textsuperscript{170} As with most issues affecting the binational region, environmental justice demands along the border melded concerns regarding hazardous industrial development as well as larger questions of social justice and equity to create unique manifestations of environmental justice activism.\textsuperscript{171}

These largely poor, Mexican/Mexican American border communities contended with a quagmire of fragmented jurisdictional failures where multiple local, state and federal governments eluded regulatory accountability through policies that blamed pollution on sources outside of their control. One example of such a policy is Section 818 of the 1990 amendment to the Clean Air Act, which provided relief for cities along the international border that could demonstrate that their emissions levels would meet federal standards but for emissions emanating from another country. By enacting this clause, the U.S. Congress allowed state and local governments to submit air quality modeling which demonstrated that their abatement efforts were sufficient to meet NAAQS requirements, even if emissions data showed violations of the standards for the affected communities. On the Mexican side, insufficient resources limited the federal and local governments’ ability to effectuate a meaningful environmental


protection apparatus through the 1990s. In effect, this meant that industrialization could continue undeterred, with new emissions permits issued on both sides of the border while border residents suffered the health consequences of worsening air quality without governmental remedy.  

In 1994, the U.S. President Bill Clinton issued an executive order titled, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.” This executive order directed federal agencies to:

- make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States.

However, this executive order was meaningless in border communities where imperatives related to national security, illegal immigration, and drug interdiction have outweighed any directives related to environmental justice – particularly with regard to trade traffic at the ports of entry.

In theory, the Agreement Between the Government of the United States of America and the Government of the United Mexican States on Cooperation for the Protection and Improvement of the Environment in Border Areas, also known as the La Paz Agreement of 1983, provided a protective framework intended to address the environmentally damaged and fragile region. Although the La Paz Agreement did not include the term environmental justice, the Agreement called on the parties to undertake appropriate measures to address sources of


173 INE/SEMARNAP, Primer Informe Sobre la Calidad del Aire en Ciudades Mexicanas, 57.


pollution that affected the border area of the other. The agreement also called on the Parties to assess and take appropriate measures to mitigate or avoid policies and projects believed to have significant environmental impacts on the border.  

**CONCLUSION**

Despite the La Paz Agreement and numerous subsequent agreements between the U.S. and Mexico (examined in the next chapter), federal policies in both countries have subjected border residents to an inordinate environmental burden in the name of free trade and economic development. As a result of federal customs policies and woefully inadequate investment in trade-related infrastructure, border communities have been contaminated by thousands of tons of toxic emissions. For those low-income, minority communities located adjacent to ports of entry, the inequitable exposure to environmental hazards is even more pronounced. Furthermore, insufficient investment in environmental regulatory resources has enabled polluters ranging from multinational corporations to family-owned brick kilns to pollute border communities with minimal, if any, accountability.

This was most certainly the case for the Paso del Norte region. As this chapter illustrated, the widespread industrialization of the region for the purposes of expanding global trade, without the necessary regulatory and infrastructure resources from the U.S. and Mexican governments, placed an unsafe and unsustainable burden on Paso del Norte residents. In turn, border residents and environmental activists have responded with cross-border collaborations that capture both local and global dimensions of environmental justice. The following chapters will examine the

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175 La Paz Agreement, Articles 1 – 7.
evolution of border environmental policy as well as one of those cross-border environmental coalitions that advocated for transboundary management of shared resources.
Chapter Three: Environmental Governance Structures of the U.S. Mexico Borderlands

In 1853, the United States and Mexico signed the Treaty Relating to the Boundary line, Transit of Persons, etc., across the Isthmus of Tehuantepec, also known as the Gadsden Treaty. This treaty involved the sale of thirty thousand square miles of Mexican territory to the US for a sum of $15 million. The Gadsden Treaty came on the heels of the Treaty of Guadalupe Hidalgo of 1848, which ended the Mexican War, or as Mexicans referred to it, the War of the North American Invasion. Mexico emerged from this conflict and treaty having ceded one half of its territory to the United States – which in turn increased the latter nation’s size by one third. This map illustrates the territory Mexico lost to the U.S. between 1848 and 1853. It was under the pall

Figure 6. Territory Acquired from Mexico

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of this conflict, resentment, and loss that border relations between the US and Mexico commenced.\textsuperscript{178}

The Treaty of Guadalupe Hidalgo called for the creation of the Joint United States and Mexico Boundary Commission – a body charged with surveying, mapping and demarcating the newly defined boundary line. Beginning in 1849, this endeavor involved teams of scientists, diplomats, bureaucrats and military personnel from both countries, who toiled for more than seven years to carry out the mission of mapping out this border region. Joined in this common mission, the teams of American and Mexican surveyors faced hardships and challenges that could not have been anticipated or understood by officials in Washington D.C. or Mexico City. Those who negotiated the boundary line did so without knowledge or consideration of geographic conditions, climate, and other factors critical to the demarcation process.\textsuperscript{179}

In addition to the terrain they were sent to chart, these survey teams discovered that their very survival would require cooperation and collaboration. They faced significant difficulties with transportation, extreme weather, equipment failures, lack of funding and hostilities from indigenous communities who rejected the sovereignty of the Commission. According to Rachel St. John, the teams worked with a great deal of mutual respect, placing their mission above divisive national politics.\textsuperscript{180} While this binational expedition may have established a cooperative


relationship that enabled them to survive the unfamiliar environment, C.J. Alvarez explains that they also shared cultural and racial biases that reflected their derisive views of the border and its residents. Their correspondence and official reports often referred to the desert environment as a wasteland and associated the adobe homes that facilitated survival in the desert climate with filth, misery and uncivilized living. One surveyor described the border as a “worthless region, where boundary disputes are not likely to occur.”\(^{181}\)

From the perspective on binational governance, the survey expeditions established a mixed legacy. On the one hand, these teams of professionals established a foundation for US/Mexico cooperation among government officials charged with managing border issues. These teams of foreigners with little knowledge of the territory completed an arduous, and at times life-threatening, joint mission in collaborative manner. On the other hand, Alvarez contends that they “inaugurated a long tradition of…skepticism, dismissiveness and revulsion about desert environments and the people.”\(^{182}\) In the decades that followed, regional government officials and community leaders who understood the needs of the border region were forced to navigate through these traditions of bias and dismissiveness prevalent within numerous federal agencies. These local leaders would make the case for cooperation across national jurisdictions in order pursue regional goals, despite the tendency toward nationalist agendas.

Since 1853, there have been a series of binational agreements between the US and Mexico, intended to strengthen the sovereignty and power of the federal governments on either side of the nascent boundary. Some of these agreements were designed to create mutual, albeit disparate, benefit in economic and environmental spheres. This chapter explores the


\(^{182}\) Alvarez, *Border Land, Border Water*, 26, 52.
development and evolution of treaties and other mechanisms designed to manage shared natural resources and protect the environmental health of the U.S.-Mexico border region. For comparative purposes, it examines a relevant treaty related to the U.S.-Canadian border as well. It also analyzes the ways in which formal bilateral frameworks became increasingly collaborative and responsive to border communities who demanded solutions to address the challenges of managing and protecting transboundary natural resources. While this is not an exhaustive analysis of environmental agreements between the U.S. and its neighbors, it pays particular attention to those that have proven to be most consequential to the borderlands in the second half of the twentieth century. Finally, this chapter also introduces the case study of the Paso del Norte region that illustrates the progress and tangible transformations achieved in redefining border environmental policy and creating legally-recognized collaborative, stakeholder-driven governance structures.

**Boundaries versus Borders – Models of Shared Resource Governance**

Michiel Baud and Willem Van Schendel differentiate between the terms *boundaries* and *borders* to make the critical conceptual distinction in the study of borderlands. Whereas the former conveys the existence of a physical or cultural divide, the latter is more often utilized to emphasize a region rather than delineations on a map.\(^{183}\) We can see the application of this conceptual distinction as we look at the early U.S.-Mexico treaties and bilateral organizations that were most concerned with the administration of jurisdictional authority and control of shared natural resources during the late 19\(^{th}\) and early 20\(^{th}\) century. The pervasive theme of border policy during this period was controlling the fluidity of people and natural resources – in an

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attempt to impose stasis in a region characterized by mobility. Utilizing Baud and Van Schendel’s framework, this period was characterized by boundary policy rather than border policy. During the latter half of the 20th century when globalization intensified the economic stakes for both the U.S. and Mexico, and the environmental degradation of the borderlands became clearer and more pronounced, the language of bilateral environmental treaties and organizational frameworks began to focus more broadly on the border as a region rather than on the location of a boundary.

One of the first examples of a boundary-focused organization was the International Boundary Commission (IBC), authorized by a treaty signed by the United States and Mexico in 1889. The IBC, formally organized in 1894, was established to monitor and survey the portions of the U.S.-Mexico border where the boundary is formed by either the Rio Grande or the Colorado River. The IBC was deemed necessary because of the changes and shifts in the beds of both rivers. It was also imperative to have an organization charged with administering the stipulations of all relevant treaties. The jurisdiction of the IBC included the examination of all differences or questions that arose regarding alterations in the course of the rivers or any works constructed on the river that might affect its course. For the Paso del Norte region, the IBC was instrumental in the Rio Grande Rectification Project that spanned the period of 1934 to 1938.

184 Alvarez, Border Land, Border Water, 5.
185 That is not to say that border control policy subsided in the late 20th century. Rather, that bilateral agreements during this period began to address management and protection of shared environmental resources that span the US/Mexico boundary. For more on late 20th century border control policy, see Kelly Lytle Hernandez, Migra!: A History of the U.S. Border Patrol (Berkeley: University of California Press, 2010); C. J. Alvarez, Border Land, Border Water: A History of Construction On The US-Mexico Divide (Austin: University of Texas Press, 2019).
This boundary dispute project required the reconstruction and straightening of the path of the river, and ultimately involved the exchange of approximately 3500 acres of land.  

In accordance with the treaty, the IBC consists of two sections, each country having its own section headed by a commissioner with an ambassador-level appointment, selected by the president of the respective country. These commissioners were (and continue to be) required to be professional engineers and their section staffs include engineers, interpreters, and legal specialists. The commissioners present their findings on given disputes to the U.S. State Department and the Mexican Secretaría de Relaciones Exteriores. In 1944, the Commission's name was changed to its current name, the International Boundary and Water Commission, and given several added responsibilities regarding the joint use of international surface waters for the following purposes: domestic and municipal uses; agriculture and stock raising; electric power and other industrial uses; navigation; and fishing and hunting.

Over the years, the Commission has faced issues regarding riverbeds and surface water distribution as well as disputes regarding ground water, water quality management, and border sanitation problems. One such dispute took place when U.S. farmers along the Colorado River caused the water’s salinity level to rise, rendering several thousand acres of downstream Mexican farmland useless. In this case, the IBWC was at odds with the U.S. Bureau of Reclamation with regard to the cause of and solution to this problem. Ultimately, the U.S.

187 “Convention-Mexico-Boundary.”
government charged the IBWC with building a desalinating facility in the Yuma valley that attempted to correct the salinity problem in the Mexicali Valley. The 260 million dollar project took almost two decades to bring online and turned out to be a solution that was ill-suited for the complexity of the problem.\textsuperscript{190} True to its charge regarding boundaries, the IBWC also played an integral role in the construction of the border control infrastructure including border fencing and barricade building projects all along the boundary line.\textsuperscript{191}

Although it has performed its prescribed duties in accordance with its mandate and some have considered it a model of international cooperation related to its mandate, the IBWC has drawn criticism from border communities because of its limited jurisdiction and the disconnected role it has occupied within the border region. For decades they had been visibly present with their offices situated along the border; however, the strict technical staffing and IBWC office reporting procedures did not allow for community input regarding solutions to what are essentially their problems. That is to say, the 1944 treaty did not codify engagement with the communities they serve, which was therefore not a practice of the IBWC. In their attempts to keep the IBWC as focused on managing boundary issues as possible, the federal governments created an institution that was largely disengaged and out of touch with the communities within which they operated.\textsuperscript{192}

The IBWC bridged some of this lack of outreach and community engagement via other binational agreements and initiatives, which created new channels to bring border community concerns to its attention. For example, following the passage of the NAFTA in 1994 and the subsequent creation of the Border Environment Cooperation Commission (BECC), both IBWC

\textsuperscript{191} Alvarez, \textit{Border Land, Border Water,} 5, 9, 190, 206-207.
section leaders were required to serve as ex-oficio members of the BECC board of directors. The BECC board of directors was required to consult with community stakeholders regarding critical environmental infrastructure projects and hold quarterly public forums throughout the border region.\textsuperscript{193} These forums provided a welcomed opportunity for border communities to communicate directly with both IBWC section leaders. For the IBWC Commissioners, these forums and community contact they enabled were possible only because the bilateral agreements that created the BECC superseded the rather hidebound and rigid guidelines of the 1944 treaty that established the IBWC and had heretofore made such engagement impermissible.\textsuperscript{194}

For comparative purposes, it is useful to look at a similar binational organization created to manage shared natural resources along the U.S./Canada border. The International Joint Committee (IJC) is an organization established through the Boundary Waters Treaty of 1909 between the United States and Canada. The IJC was created in order to supervise the observance of obligations of the two countries under the 1909 treaty, as they pertain to the planning and management of water resources in the Great Lakes Basin. As prescribed by the treaty, the IJC is led by six commissioners, three political appointees named by the president or prime minister of each country. Notably, the commissioners are required to sign a declaration that she/he will “impartially perform the duties imposed upon him under this treaty,” presumably

\textsuperscript{193} BECC was created parallel with NAFTA in order to work with the North America Development Bank and other financial institutions to supply capital for environmental infrastructure projects and sustainable development in the border region. International Boundary and Water Commission, United States Section Website, “History of U.S. Section Commissioners” \url{https://www.ibwc.gov/About_Us/Commish_History.html} (accessed 12/27/2020)

\textsuperscript{194} Carlos Rincón, interview by author, November 20, 1995. Unfortunately for border communities, the public forums and community input facilitated by the BECC Board of Directors meetings were eliminated in 2017 when the U.S. and Mexico merged the BECC into the North American Development Bank (NADB). The NADB board does not include the IBWC Section Commissioners. For more on this merger see: “NADB-BECC Board of Directors moves forward with institutional integration; approves US$823 million in financing for new infrastructure projects along the U.S.-Mexico border,” \url{https://www.nadb.org/news/nadb-becc-board-of-directors-moves-forward-with-institutional-integration-approves-us823-million-in-financing-for-new-infrastructure-projects-along-the-us-mexico-border}. 

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to emphasize that they are not to serve nationalist aims. Much like the reporting structure of the IBWC, the IJC is under the direct purview of the Department of External Affairs in Ottawa and the State Department in Washington D.C.¹⁹⁵

The IJC has an investigative and fact-finding function that it exercises through referrals that it receives from either country. Although the treaty allows for a unilateral referral to be made to the IJC, traditionally both countries have cleared their referrals with one another before forwarding them to the IJC. Some scholars believe this custom has served to depoliticize the IJC’s work. They argue that the IJC has further depoliticized its work by placing a tremendous amount of emphasis on technical expertise. They have done this by establishing a scientific board that draws staffing resources from government agencies on both sides of the border.¹⁹⁶ Other scholars argue that the IJC has been considered a highly technical and depoliticized body because the referrals it has received over the years are those for which the two governments were largely in agreement regarding potential solutions. Said differently, the two governments rarely referred issues to the IJC for investigation and recommendations if there were serious disagreements regarding the desired outcomes.¹⁹⁷

Perhaps because of both the technical nature of the IJC and the issues referred to it, the commission has eschewed publicity and political sensationalism - making it a rather obscure entity. The general commitment to impartiality among the commissioners is reflected in its referral record, which indicates that of the more than one hundred referrals they have received since 1912,

only three have resulted in divisions along national lines. This is a very unique characteristic for a bi-national institution given the tendency for parties to become entrenched in national interests and lose sight of the common goal of resource protection.\textsuperscript{198} Of course, there are also examples of highly controversial projects where the IJC was essentially sidelined and therefore was not allowed to issue a recommendation. Such was the case with the dam construction and subsequent flooding in the Columbia River valley. The IJC had investigated the matter and issued two environmental impact reports, but ultimately the 1961 Columbia River Treaty was settled through government-to-government negotiations rather than through IJC, despite their early involvement.\textsuperscript{199}

During the first half of the twentieth century, the IJC was a strong proponent of ecologically damaging water-control megaprojects. By the 1950s, the role of the IJC consisted of managing or promoting many small and several major projects affecting boundary water levels and flows as well as negotiating some water apportionment and air pollution issues. After the 1960s, consistent with the growing societal environmental awareness discussed in the previous chapter, the IJC transformed into a more environmentally-minded governance body. The IJC took on several investigations regarding the cooperative development of transboundary resources at the request of both governments. In the following decades, the commission transitioned from an engineering and legal role to one of environmental protection that now characterizes it.\textsuperscript{200}

In 1972, the Great Lakes Water Quality Agreement gave the IJC ongoing surveillance and monitoring responsibilities, which was in effect an ongoing referral that allowed the IJC to become

\begin{footnotesize}
\textsuperscript{198} Schwartz and Jockel, "Increasing Power of IJC," p. 3.
\textsuperscript{199} Brooks, "The International Joint Commission: The Promise and Limits of an Ambitious Model," 7.
\end{footnotesize}
an internal environmental lobby. Nevertheless, the IJC lacked the authority to carry out any pollution reduction measures. Instead, the IJC focused on pointing out shortfalls in pollution reduction goals and new problems in the lakes such as toxic substances from non-point, or mobile, sources. In 1978, the Great Lakes Water Quality Agreement extended the IJC's watchdog role and established stringent municipal and industrial pollution abatement deadlines. In 1982, the IJC issued a critical First Biennial Review as required by the Great Lakes Water Quality Agreement. The review targeted the United States for its hypocrisy and failure to fulfill its international obligations. In addition, the report suggested that the IJC begin to incorporate "matters of social relevance, institutions, and human concerns," in order to better assess if the requirements of the Agreement were being met.201

This unprecedented rebellion by the IJC would bring it backlash from the Reagan Administration in the years following the 1982 report. In 1987, the Great Lakes Agreement Protocol limited the IJC's role to monitoring and evaluating through its biennial reports. In addition, other management and coordination roles were withdrawn. The U.S. and Canada also limited referrals to the IJC to those issues dealing with the Great Lakes, turning to other bodies to investigate shared problems such as air quality.202

Despite its reputation for being an impartial, fact-finding arbiter, the IJC remained an institution at the mercy of national politics. That once again demonstrated the vulnerability of a body that, regardless of its internal common priorities, was subject to the politics of sovereignty, which inevitably outweighed the value of a shared commons. In absence of an empowered binational governance body, the void along the U.S.-Canadian border was eventually filled to some extent.

extent by several subnational compacts and non-binding agreements established through the leadership of governors, local governments, tribal governments and other stakeholders during the early twenty-first century.\textsuperscript{203} Despite the challenges in binational environmental cooperation at the federal level beginning in the 1980s, successful subnational agreements on the northern border mirrored the transition from a focus on boundaries to border environmental resource management that was occurring along the U.S. Mexico border during the late twentieth century.

**BORDER INDUSTRIALIZATION AND ENVIRONMENTAL PROTECTION**

As we saw in chapter 2, the United States and Mexico entered into a series of mutually beneficial economic agreements during World War II that addressed the labor shortages of one country and high levels of unemployment in the other. Under the guise of supporting the Allied war effort, Presidents Franklin D. Roosevelt and Manuel Avila Camacho established the Bracero Program in 1942. By the mid-1950s, over 400,000 Mexican workers toiled in the United States every year, as a part of the Bracero Program.\textsuperscript{204}

In 1964, almost two decades beyond the expressed term of the initial agreement, the Bracero Program was terminated and tens of thousands of Mexican laborers were returned to Mexican border cities with few options for employment, insufficient housing and inadequate public services. The Mexican Government was desperate to find a solution to the crisis in border communities. In 1965, the Border Industrialization Program (BIP) - also known as the maquiladora program – eliminated tariff consequences for foreign manufacturers that established


\textsuperscript{204} Loza, *Defiant Braceros*, 2.
operations and created jobs in Mexican border communities. By marketing low-wage Mexican labor to lure US manufacturers, the BIP brought industrial growth to the border region.\textsuperscript{205}

Consistent with the growth in industry, urban border communities became home to tens of thousands of families who relocated in order to avail themselves of employment opportunities in the maquiladoras. This dramatic population increase over a short period of time strained every aspect of public infrastructure – roads, drinking water, electric/gas services, wastewater treatment facilities, housing, solid waste disposal, and public transportation. The population boom attributed to the industrialization process took an equally deleterious toll on the region’s environment and the health of border residents.\textsuperscript{206}

The degradation of natural resources and the proliferation of environmental pollution associated with rapid industrialization was made worse in the border region due to absent or incongruent environmental regulation. Indeed, the state or federal protective regimes in place at the time were limited to their respective jurisdictions – making it impossible to provide adequate protection for natural resources that flowed irrespective of such boundaries. Furthermore, the environmental regulatory authorities on the Mexican side of the border were ill equipped and under-funded to provide effective oversight of this new industrial presence.\textsuperscript{207}

In acknowledgement that the economic and social well-being of the region was inextricably tied to environmental health and that protection of such required cooperative and coordinated efforts, the federal environmental agencies of the United States and Mexico, EPA and SEDUE, entered into a Memorandum of Understanding in 1978 (hereafter MOU of 1978),

\textsuperscript{205} Ganster and Lorey, \textit{The U.S.-Mexican Border Today}, 111. Maquiladoras were allowed to import equipment, parts, and supplies duty-free so long as their output was exported back to the US.


\textsuperscript{207} Ibid.
which called for cooperation in the protection of the environment in the border region. Through the MOU of 1978, the two federal agencies agreed to meet annually to discuss shared environmental concerns and engage in parallel projects and activities. The three page document included the word “parallel” five times in its text. This is an important point because it signaled that U.S. and Mexican officials considered that environmental protection in the border region could be managed through a series of coordinated parallel projects that would be managed unilaterally on either side of the border rather than as single projects managed jointly, taking into account the complexity of transboundary natural resources.

The reality was that the “parallel” approach was not a successful strategy and environmental conditions in communities along the border continued to deteriorate. The twin cities of El Paso/Ciudad Juárez and San Diego/Tijuana had been out of compliance with the US Clean Air Act standards since the 1970s. Copper Smelters in Arizona and Sonora had been damaging crops and sickening people for decades. A six-mile stretch of the beach north of the international border at Tijuana/San Diego was under a public health quarantine due to the high concentration of sewage in the water. U.S. border communities, led by state governors, congressional delegations, and grassroots organizations began to organize and demand a cross-border agreement to address these complex environmental challenges.

At that time, U.S. President Ronald Reagan was not particularly attuned to the environmental concerns of the border, but he was feeling significant pressure from his political


base in Southern California to do something to address their polluted beaches. Mexican President Miguel de la Madrid was concerned with expanding bilateral economic relations with the U.S. and Mexico and also felt pressure to resolve the sewage problem in Tijuana. These political and economic considerations came to a head shortly before the two presidents were scheduled to meet for a summit in La Paz, Baja California in 1983. Both parties urged their foreign affairs officials to prepare a cross-border pollution control agreement that could be signed during this summit.²¹⁰

In August 1983, Presidents Reagan and de la Madrid signed the first transnational environmental agreement in North America. The protective framework intended to address this environmentally damaged and fragile region was formalized as the Agreement Between the Government of the United States of America and the Government of the United Mexican States on Cooperation for the Protection and Improvement of the Environment in Border Areas, also known as the La Paz Agreement of 1983 (hereafter the La Paz Agreement). The La Paz Agreement consisted of twenty three articles, which laid out the details that would be critical to operationalize its objectives.²¹¹

Articles 1 through 7 articulated the objectives and general parameters of the La Paz Agreement. The objectives of the Agreement were stated as such:

to establish a basis for cooperation between the Parties for the protection, improvement and conservation of the environment and the problems which affect it, as well as to agree on necessary measures to prevent and control pollution in the border area, and to provide a framework for the development of a system of notification of emergency situations.²¹²

²¹⁰ Wirth, Smelter Smoke in North America, 183-184.
²¹² La Paz Agreement, Article 1.
These articles call on the Parties to undertake appropriate measure to address sources of pollution which affect the border area of the other. The articles allow the Parties to cooperate and make arrangements for the solution of common problems in the border region, which is defined as “an area 100 kilometers on either side of the inland and maritime boundaries between the parties.”

This cooperation included cooperation in program coordination, scientific exchanges, environmental monitoring, impact assessments, and the exchange of data and information. They also called on the Parties to assess and take appropriate measures to mitigate or avoid policies and projects believed to have significant environmental impacts on the border.

Notably absent

Figure 7. U.S.-Mexico Border as Defined by La Paz Agreement

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213 La Paz Agreement, Article 4.
in the La Paz agreement are the directives to develop parallel activities. As detailed below, it emphasized collaborative projects and binational working groups. (Figure 7 illustrates the border region, as defined by the La Paz Agreement.)

Articles 8 through 16 designated national coordinators for each Party (EPA and SEDUE) and prescribed the formal meetings that must occur between the two Parties to review implementation of the agreement. These articles also outlined the communication between the Parties and their respective national coordinators. Of significance, these articles authorized the national coordinators to invite and engage governmental officials at the local, state and federal level, as well as non-governmental organizations. This was a critical because it acknowledged the complexity of jurisdictions and stakeholders involved and recognized the contributions these stakeholders could make in developing solutions.215

Articles 17 through 21 include such details as the term of the La Paz Agreement, the process for amending and/or terminating it, as well as the dependence of the Agreement on the funding, laws and regulations of each Party. Article 22, comprised of two lines, prescribes the process for the adoption of annexes – the vehicles by which collaborative projects could ultimately be developed and executed. Finally, Article 23 stated that the La Paz Agreement superceded the MOU of 1978.216 This last article can be interpreted as a recognition that the MOU of 1978 represented an important first step in providing a collaborative framework for the protection of the border environment, but was insufficient in its scope, reach, and substantive engagement.217 In fact, the La Paz Agreement included language that reflected the spirit of the MOU of 1978, indicating that it clearly served as a foundation. However, the La Paz Agreement

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215 La Paz Agreement, Articles 8 – 16.
216 La Paz Agreement, Articles 17-23.
217 MOU of 1978.
carried the weight and authority of a treaty and it prescribed far more focused coordination, exchange, and collaboration toward the goal of remediating and protecting the environmental health and well-being of the border region.

The La Paz Agreement served as a turning point – a pivot in the way the U.S. and Mexico would approach environmental management and conservation along a 100km wide swath of land that runs the length of the 2000-mile international boundary. It clearly signaled the transition from the boundary approach of previous agreements and treaties to a border approach to shared resource management. By the time the La Paz Agreement was signed in 1983, the U.S./Mexico border region had endured the significant, and in some instances, devastating environmental consequences brought by the proliferation of the maquiladora industry over the span of more than two decades. As such, there was no shortage of environmental hazards for which to engage the La Paz Agreement in collaborative ways.

Structurally, the La Paz Agreement itself only provided a vehicle for environmental authorities on either side of the border to begin to collaborate. It would require the development and approval of a series of annexes to the La Paz Agreement in order to enable cross-border collaboration around specific environmental challenges. An analysis of these annexes illustrates the ways in which border communities and environmental officials leveraged the authority of the La Paz Agreement in truly significant ways for the benefit of the regional border environments and the inhabitants of the region.

In July 18, 1985, the United States and Mexico signed the first Annex to the La Paz Agreement. Annex I established an agreement of cooperation between the Parties for the solution of the border sanitation problem in the San Diego, California – Tijuana, Baja California region. This agreement brought to bear the resources of the IBWC and the Inter-American
Development Bank for development of potable water and wastewater infrastructure in Tijuana. Specifically, Annex I put in place a structure by which the U.S. and Mexico agreed to: 1) anticipate the effects of this infrastructure development and take measures to protect the regional environment; 2) create a mechanism for bilateral consultation during the planning phase of the project; 3) perform immediate repairs on the system in the event of a breakdown or interruption in service and employ a mechanism through the IBWC by which to request assistance from the U.S. if required; 4) take timely corrective action in the event that the IBWC identifies a problem in the construction, operation, and maintenance of the waste water facilities; 5) take joint action in the event that a sewage spill from Tijuana enters the U.S.\textsuperscript{218} By way of the La Paz Agreement and Annex I, the U.S. and Mexico had the legal framework to augment and extend the scope of work of institutions such as the IBWC and the Inter-American Development Bank to address this urgent border infrastructure crisis. This project began to address the water and wastewater needs of over 700,000 residents of Tijuana while simultaneously protecting the ecosystems in the Tijuana estuary and the beaches in the Tijuana-San Diego area.\textsuperscript{219}

The second annex to the La Paz Agreement, also signed on July 18, 1985 in San Diego, called for an agreement between the U.S. and Mexico to protect the inland international boundary from discharges of hazardous substances. Recognizing that such discharges constituted a threat to public health and welfare, the Parties agreed to establish a Joint Response Team (hereafter JRT) and develop the “United States-Mexico Joint Contingency Plan” as a cooperative mechanism to effectively address incidents. This agreement called on the Parties to

\textsuperscript{218} “Annex I To The Agreement Between The United States Of America And The United Mexican States On Cooperation For The Protection And Improvement Of The Environment In The Border Area Agreement Of Cooperation Between The United States Of America And The United Mexican States For Solution Of The Border Sanitation Problem At San Diego, California - Tijuana, Baja California.” July 18, 1985. United States Treaties and Other International Agreements.
\textsuperscript{219} Environmental Plan for the Mexican-U.S. Border Area. 12.
commit themselves to the development of response plans designed to detect existing or imminent polluting incidents and mitigate the effects to the environment and the public. It outlined in detail the structural elements of the Joint Contingency Plan, which directs each Party to divide its territory into areas and designate On-Site, Advisory, and Liaison Coordinators to oversee, manage, and respond to polluting incidents in collaboration with their counterparts based on a set of common criteria. The agreement also details the binational membership of the JRT, the reporting/communication between the JRT co-chairs and the National Coordinators, as well as the mechanisms for executing the work of the JRT in collaboration with the On-Site Coordinators, in the event of a pollution incident that warranted a joint response. This elaborate structure was established in order to be able to mobilize resources across national jurisdictions to respond as rapidly and effectively as possible to the discharge of hazardous substances and the related threats posed to the public and the environment of the U.S.-Mexico border region.²²⁰

Signed on November 12, 1986, Annex III provided for cooperation between the U.S. and Mexico regarding the transboundary shipments of hazardous wastes and hazardous substances. The preamble for this agreement acknowledged the health and environmental damage that can occur as a result of improper handling of hazardous wastes. As such, this agreement sought to minimize the risk and potential damage associated with the transboundary transport of hazardous materials. Elaborated in extensive detail, this agreement establishes a protocol for collaboration in monitoring of transboundary shipments. Specifically, it articulates requirements for: notification of exports/imports, notifications for regulatory changes that affect export/import of

²²⁰ “Annex II To The Agreement Between The United States Of America And The United Mexican States On Cooperation For The Protection And Improvement Of The Environment In The Border Area Agreement Of Cooperation Between The United States Of America And The United Mexican States Regarding Pollution Of The Environment Along The Inland International Boundary By Discharges Of Hazardous Substances,” July 18, 1985. United States Treaties and Other International Agreements.
hazardous substances, readmission of exports, exchange of information and assistance, protection of confidential information, and other procedures necessary to track and safely manage transboundary shipments. The agreement also articulates procedures for remediation and compensation in the event that this Annex is violated and damages occur. Much like Annex II addressed polluting incidents, Annex III was intended to create a robust structure of collaboration and coordination in an effort to jointly manage and mitigate risk associated with the transport of hazardous materials within the border region.221

Less than three months later, on January 29, 1987, the Parties signed Annex IV, an agreement of cooperation regarding transboundary air pollution caused by copper smelters along the US-Mexico border. This Annex was developed in the midst of a maelstrom of community-led protest and legal action against the operations of three copper smelters in the Arizona-Sonora border region known as the Gray Triangle. The deleterious effects of smelter-related contamination on human health, crops, and property were so extensive that the EPA forced the closure of the copper smelter in Douglas, Arizona on January 15, 1987. The Mexican government had also agreed to require the installation of cleaner technology for the copper smelter in Nacozari, Sonora.222 Annex IV set in place several measures to further protect and improve the air quality along the entire border region. The agreement set a limit for the allowable emissions of sulphur dioxide for any copper smelters in operation within 100 kilometers of the U.S.-Mexico border. It prescribed monitoring and record keeping requirements for such operations. The agreement called for the creation of a working group of

221 “Annex III To The Agreement Between The United States Of America And The United Mexican States On Cooperation For The Protection And Improvement Of The Environment In The Border Area Agreement Of Cooperation Between The United States Of America And The United Mexican States Regarding The Transboundary Shipments Of Hazardous Wastes And Hazardous Substances,” November 12, 1986. United States Treaties and Other International Agreements.
222 Wirth, Smelter Smoke in North America, 107, 163.
technical government experts known as the U.S.-Mexico Air Quality Working Group (hereafter Air Working Group). The Air Working Group was charged with meeting every six months to review progress toward the abatement of smelter-related pollution and presenting recommendations for additional corrective actions to the National Coordinators. The Air Working Group was authorized to include participation of local and state officials “as appropriate or necessary.” Both Parties agreed to promote legislation required to secure regulatory authority should additional measures be necessary to address smelter-related pollution.223

The last of the annexes, Annex V was an agreement for cooperation between the U.S. and Mexico regarding the movement of urban air pollution across international boundaries. Signed on October 9, 1989, this agreement recognized that there were urban areas along the border that failed to meet their respective air quality standards and had no hope of making significant improvements without addressing the flows of air pollution across international boundaries. The effects of these poor air quality conditions were two-fold: 1) residents of the affected areas suffered the harmful health effects of urban air pollution; and 2) U.S. border communities faced limitations to economic growth because permits for industrial developments were limited, if not halted altogether, as a result of being in non-attainment of air quality standards. It is also important to note that at this time, NAFTA debates and negotiations were ongoing. Politically, it was critical to acknowledge and begin to address the failures in air quality regulation in border communities that would be expected to sustain additional growth in industry and trade-related

223 “Annex IV To The Agreement Between The United States Of America And The United Mexican States On Cooperation For The Protection And Improvement Of The Environment In The Border Area Agreement Of Cooperation Between The United States Of America And The United Mexican States Regarding Transboundary Air Pollution Caused By Copper Smelters Along Their Common Border,” January 27, 1987. United States Treaties and Other International Agreements.
congestion under NAFTA. This agreement called on affected areas to install and operate a comprehensive web of air monitoring technology that would enable air modeling analysis and the creation of an air pollution source inventory. The Parties agreed to share data, harmonize air quality standards, and develop a plan to address individual sources of pollution in their respective territories, as identified in the pollution source inventories. Annex V represented a critical expansion in the reach of the La Paz Agreement in that it allowed for collaborative efforts to address air pollution from all sources and industries in the border region.

For the Paso del Norte community, Annex V provided a vehicle by which to advocate for change in the air quality management of the region. A significant step toward transboundary management came in the form of an appendix seven years after Annex V was executed. On May 7, 1996, Mexico’s Secretary of Foreign Affairs Angel Gurria and U.S. Secretary of State Warren Christopher signed Appendix 1 to Annex V, which created the Joint Advisory Committee on Air Quality Improvement for the El Paso - Ciudad Juárez - Dona Ana County Air Quality Management Basin (Hereafter JAC). The Appendix identified the air basin as the geographic area including El Paso County, Texas, the metropolitan area of Ciudad Juárez, Chihuahua, and parts Doña Ana County that are within one hundred kilometers from the border. The objective of the JAC was to develop and present recommendations for regional pollution control and prevention strategies to the Air Working Group established in Annex IV.225

225 “Appendix I Annex V To The Agreement Between The Unites Mexican States And The United States Of America On The Cooperation For The Protection And Improvement Of The Environment In The Border Area Agreement For Cooperation Between The United Mexican States And The United States Of America Regarding International Transport Of Urban Air Pollution,” May 7, 1996. United States Treaties and Other International Agreements.
The JAC structure called for a body consisting of 20 persons, ten from each country, appointed by the SEMARNAP and the EPA. The U.S. section must include one representative of the federal government; one representative of the States of Texas and New Mexico; one representative from local government in El Paso, TX; one local representative from Doña Ana County, NM; and five non-government members who reside in the area, at least one of whom is a representative of the business community and one representative of a non-governmental organization whose activities relate to air quality. The Mexican section must include a representative of the National Institute of Ecology; one representative of the Federal Attorney for Environmental Protection; one representative of the federal health and welfare agency; one representative of the environmental authorities of the State of Chihuahua; one representative of the environmental authorities of the Municipality of Ciudad Juárez; and five Mexican citizens who reside in Ciudad Juárez, at least one of whom is a representative of the private sector, one who is a representative of a non-governmental organization whose activities relate to air quality, one who is a representative of the academic institutions in Ciudad Juárez, and one who is a representative of the Consulting Council for Sustainable Development in the Northern Region.226

The JAC was charged with developing recommendations for the Air Working Group related to a broad scope of activities. These activities included monitoring and modeling air pollution prevention and abatement strategies, exchange of data and information, technical assistance and technology exchanges/transfers, education and public outreach initiatives, and innovative strategies for pollution abatement including emissions trading and other economic incentive programs. The scope of activities mirrored many of the innovative projects that

226 Ibid.
collaborators in the air basin had been developing and carrying out in the years leading up to this approval.227

Appendix I to Annex V is quite noteworthy for a couple of reasons. The first is that it formally recognized the binational, tristate air basin as a transboundary geographic formation that required collaborative air quality management strategies in order to affect change. Another ground breaking aspect of Appendix I is that the JAC was the first formally recognized U.S.-Mexico border environmental advisory body in which the participation of non-governmental stakeholders from the border region was codified. The approval of Appendix I came after years of advocacy from community stakeholders who insisted on the recognition of the region as a joint air basin rather than a conglomeration of distinct jurisdictions. The following chapter explores the efforts of these community stakeholders and their allies that led to this important advancement in transboundary air quality management.

CONCLUSION

In Continental Crossroads: Remapping U.S.-Mexico Borderlands History, Samuel Truett and Elliott Young wrote:

Few border people considered themselves peripheral – most saw their own communities as central – but empires and nations mattered, and part of what made frontiers and borders distinctive was their position at the edges of states and state making.228

As one examines the evolution of industrialization, community-based advocacy and the emergence of collaborative transboundary governance in the U.S./Mexico border region during the mid to late twentieth century, Truett and Elliott’s statement rings true. The Bracero program,

227 Ibid.
the BIP, and the many associated intended and unintended outcomes, were initiatives driven by nation-states. However, it was the “border people,” *fronterizos*, who demanded changes in governance structures and protective mechanisms for their environment, their natural resources, and their quality of life. Through their activism and protests, communities spanning the U.S.-Mexico border made their concerns central to the economic discourse of the nation-states that ultimately led to the adoption of the La Paz Agreement and its critical Annexes. It was because of these efforts that the U.S. and Mexico began to shift from boundary-focused treaties and agreements to agreements that acknowledged and encouraged collaboration in the protection of the border region’s environmental resources. The next chapter explores how one group of *fronterizos* created a binational, multi-sector stakeholder coalition named the Paso del Norte Air Quality Task Force (PDNAQTF) - which became a catalyst for the environmental protection of their community.
Chapter Four: *Fronterizo* Advocacy in the Paso del Norte Air Basin Sets the Stage for the Transformation of Border Environmental Management

During the early 1990s, the United States, Mexico, and Canada were in the midst of negotiations for a North American Free Trade Agreement (NAFTA). This trade agreement was of highest priority on the foreign policy agenda of newly elected U.S. President Bill Clinton.\textsuperscript{229} Environmental and labor activists and grassroots organizations throughout the North American continent mobilized to block passage of the trade agreement, citing among many concerns, the widespread environmental degradation and labor exploitation that occurred along the U.S./Mexico border because of the BIP and the maquiladora industry.\textsuperscript{230} While the involvement of civil society in the trade policy debates did not result in the blockage of the NAFTA, it was instrumental in raising the profile of environmental concerns faced by residents along the U.S./Mexico border.\textsuperscript{231} Ultimately, these environmental and labor coalitions helped pave the way for the creation of the NAFTA side agreements – the North American Agreement on Environmental Cooperation (NAAEC) and the North American Agreement on Labor Cooperation (NAALC) – which provided an official tri-national infrastructure for denouncing labor and environmental violations.\textsuperscript{232}

\textsuperscript{231} Scholte, Jan Aart. “Civil Society and Democracy in Global Governance.” in \textit{Civil Society and Global Finance}, ed. J.A. Scholte and A. Schnabel (New York:Routledge,2002), 11-32. “Civil Society” is defined by Jan Aart Scholte as “a political space where voluntary associations explicitly seek to shape the rules (in terms of specific policies, wider norms, and deeper social structures) that govern one or other aspect of social life.”
\textsuperscript{232} Foster, “The Trinational Alliance Against NAFTA: Sinews of Solidarity,” 214-215.
For fronterizos in the Paso del Norte region and their allies, these international debates regarding trade and border environmental conditions provided the necessary context and public pressure to prime federal and state support in the U.S. and Mexico for the projects and initiatives they believed would help address their environmental challenges. As we saw in Chapters 3 and 4, residents of the Paso del Norte air basin suffered from air pollution-related health problems and industry faced government-imposed limitations to growth due to El Paso’s non-attainment status. Meanwhile unilateral air quality governance measures failed to address growing transboundary challenges. Given the grim state of the air quality and the ineffectiveness of government oversight, many concerned fronterizos from various sectors of the community initiated projects and investigations aimed at improving their region's air quality. Drawing on the fronterizo identity described in Chapter 2, these individuals and organizations took it upon themselves to seek solutions. Some initiatives were spearheaded by different business and civic organizations, such as the Sunturians of El Paso and FEMAP (Federacion Mexicana de Asociaciones Privadas de Salud y Desarrollo Comunitario) in Ciudad Juárez. There were also researchers from the academic institutions in the region who focused their efforts on gathering data and developing data-driven strategies. Often this research involved cross-border collaborative research between institutions.233

Initially, many of these efforts were not coordinated with other interested parties. Increasingly, however, these individuals and organizations became convinced that due to the natural characteristics of the air basin, transboundary cooperative endeavors were necessary. At

that point, however, there was no effective coordinating mechanism in place to bring together these stakeholders. This chapter looks at the formation of the binational, tristate environmental advocacy organization named the Paso del Norte Air Quality Task Force (PDNAQTF)—a multi-sectoral group that came together in order to address deteriorating air quality conditions in the Paso del Norte region. It examines the origins of the organization as well as the impact of the projects it developed. The most significant of these projects was the adoption of Appendix 1 to Annex V of the La Paz Agreement, which created the Joint Advisory Committee on the Air Quality Improvement for the El Paso–Ciudad Juárez–Doña County Air Quality Management Basin (JAC). This chapter will also explore the formation and early work of the JAC, which in many ways continued the work of the PDNAQTF through institutionalized channels. It also concludes that the JAC became the blueprint for community engagement in the border environmental management frameworks that had historically excluded border communities.

**Epistemic Communities on the Frontera**

Political scientist Peter M. Haas has published influential works related to social learning and collective community formation as it relates to the evolution of multilateral environmental governance and policy coordination. Haas provides a valuable theoretical framework within which to consider the air quality improvement efforts in the Paso del Norte region. Specifically, Haas utilizes the concept of ecological and transnational epistemic communities to explain the advancement of human knowledge and global policy. He describes an epistemic community as a network of professionals with expertise and competence in a particular area or domain who can provide policy-relevant knowledge within that area or domain. The epistemic community may include professionals from diverse fields who share the following: 1) a common set of beliefs
that provide a value-based rationale for social action among community members; 2) a shared set of causal belief related to a central problem in their domain that then informs policy recommendations; 3) shared criteria for considering and validating knowledge in their domain of expertise; and 4) a common policy objective or enterprise. In the area of transnational environmental policy, Haas argues, epistemic communities have informed multinational organizations and have helped craft international environmental regimes for the protection of endangered habitats and shared natural resources. As this chapter will illustrate, this model of collective expertise and advocacy applies well to the PDNAQT and JAC. But the processes that this model describes were, in the case in question, overlaid on a community with an ethos and an identity centuries in the making. As such it is critical to consider this epistemic community as one with a strong *fronterizo* identity.234

**FORMATION OF THE PASO DEL NORTE AIR QUALITY TASK FORCE**

In 1990, Texas elected Governor Ann Richards – a democrat who committed herself to making state government more inclusive. One mechanism she utilized to do that was the appointment of African-Americans, Hispanics, and women to state boards and commissions. According to a brief biography published by her campaign, Richards appointed more underrepresented minorities than both of her predecessors combined.235 At the end of 1992, a position on the Texas Air Control Board (TACB) became vacant. The TACB was a nine-member

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235 Governor Ann Richards Biography, Author and date of publication unknown. Published by the Ann Richards Committee. Copy with author. Authors note: Although appointments of minorities and women from diverse communities to state boards and commissions does not necessarily translate into a more inclusive government, this strategy was intended to broaden gender, racial and geographical representation in state government and thereby amplify the voices of previously unrepresented communities.
body, appointed by the governor, which was charged with protecting the air resources of the state through air pollution abatement and control, while balancing human health and economic considerations.236

At that time, there were four areas in Texas that were in non-attainment of federal air quality standards - one was El Paso. Given the imperative to address the state’s non-attainment areas and the timeliness of addressing border air quality, the governor’s appointments staff was focused on finding an El Paso appointee to help the TACB develop effective strategies for the region. In early 1993, Richards appointed Dr. Elaine Mowinski Barrón to fill this vacant position. When the governor’s staff reached out to Dr. Mowinski Barrón, she was the Chairperson of the Public Relations Committee for the El Paso County Medical Society. That year, Dr. Barrón had been working to get more physicians involved in community activities to speak out and educate people about the need to protect health through environmental protection. She was also an active member of the Texas Medical Association Environmental Health Committee – the volunteer service that most likely brought her to the attention of the governor’s appointments staff, given that she was not a campaign contributor or political operative. She began serving on the TACB, chaired by Kirk Watson, in January of 1993.237

As TACB began to examine the air pollution situation in El Paso, they concluded that because of the low-income levels in the city and the inextricable ties to Ciudad Juárez, they had to develop a cross-border cleanup solution. This solution needed to be minimally disruptive to people's everyday lives and somehow include Ciudad Juárez in the process to ensure a more comprehensive problem solving approach. Watson consulted with the Environmental Defense

Fund (EDF) staff in Austin and Region VI EPA officials located in Dallas regarding the situation because of the work they were doing in the border region. They concurred that it would be advantageous to form an advisory committee and have it chaired by a local resident such as Dr. Mowinski Barrón. This TACB Advisory Committee would include concerned individuals from the private and non-profit sectors as well as officials from federal, state, and local governments on both sides of the border. Its purpose, according to Watson, was to "provide advice and guidance on how to clean up the air basin of El Paso/ Ciudad Juárez so that mandates of the U.S. Federal Clean Air Act can be met and Mexico's commitment to improving air quality for its citizens can be realized."

Having appointed Mowinski Barrón to chair the Advisory Committee, the TACB arranged the first meeting to take place in El Paso in May 1993. The TACB sent invitations to over thirty individuals from the region who were already on their communications mailing list. This included EPA officials, EDF representatives, and civic organizations such as EPISO (El Paso Interreligious Sponsoring Organization) and the El Paso Community Foundation. The Mexican counterparts included Secretaría de Desarrollo Social (SEDESOL) officials, members of the Ciudad Juárez municipal government, representatives of FEMAP, and academics from the Instituto Tecnológico de Ciudad Juárez. Francisco Núñez, the Director of the Municipio de Ciudad Juárez Dirección de Ecología provided assistance with identifying business and non-profit leaders who he thought should be invited to participate. He felt that in order for this initiative to be fruitful, there needed to be substantive participation from the Mexican side.

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238 Carlos Rincón, interview by author, November 20, 1995.
The TACB Advisory Committee on El Paso/Ciudad Juárez Air Quality (hereafter TACB Advisory Committee) met for the first time at the Camino Real Paso del Norte Hotel in El Paso on May 20, 1993. The day-long meeting convened with two goals in mind: to compile a list of recommended changes that could be addressed within one month, by the TACB, the EPA, SEDESOL, and the business sectors of both countries; and to evaluate and provide recommendations regarding long-term actions by August 15, 1993. The group heard presentations from the TACB, U.S. EPA, SEDESOL, the El Paso City County Health and Environmental District and Municipio de Ciudad Juárez. They then proceeded to a brainstorming session to identify critical air quality issues. Through this brainstorming, the group identified 45 issues that they grouped into six categories: auto emissions, health issues, industrial issues, particulate matter, governance, and general issues. The participants broke up into six work groups, each group assigned one of the issue categories. These work groups were charged with brainstorming strategies and potential short and long-term solutions. They focused on what federal, state, and local governments on both sides of the border could do, as well as the role of private industry in improving the region’s air quality.241

When the six work groups reported to the entire committee, several main themes emerged. A central, recurring theme was the need for an increased binational approach to shared problems in their common air basin. Participants agreed that the means by which to achieve this binational approach was through some form of legally constituted international air quality management district. They felt that the timing was good because it could be promoted within the context of the ongoing negotiations of the supplemental agreements of the NAFTA. Another

theme was the need to decrease auto emissions in both El Paso and Ciudad Juárez with improved and aligned regulations and enforcement. There was also discussion about the long-standing problems of insufficient inventories of pollution sources and the lack of a registry of diseases in the border region. By the end of the meeting, the committee had agreed upon several primary goals: 1) to meet again in the near future; 2) to use this committee to coordinate efforts concerning border air quality issues; 3) to identify a fiscal agent to receive funding for projects the committee might want to initiate; 4) to make the Pan American Health Organization aware of the committee; 5) to have high visibility, educate the public, and to involve individuals from Health and Human Resources; and 6) to invite residents from Dona Ana County, New Mexico.\textsuperscript{242}

The second meeting of the TACB Advisory Committee on El Paso/Juárez Air Quality took place on June 17, 1993, in conjunction with a TACB meeting that was scheduled for the following day. During this meeting, TACB Chairman Kirk Watson addressed the TACB Advisory Committee and conveyed his support for their cooperative efforts. To get things started, he asked that the TACB Advisory Committee work with him to develop a letter that Governor Richards might send to the appropriate individuals to request their support for a “Regional Air Quality District for the Paso del Norte region.” It was also during this meeting that Danny Vickers, president and CEO of EDM International, Inc., proposed six projects based on brainstorming from their first meeting and subsequent discussions by a Project Development sub-committee.\textsuperscript{243}

The first project was titled “Assisting Paint and Body Shops Located in Ciudad Juárez to Reduce Emissions.” The group focused on paint and body shops because these largely

\textsuperscript{242} Ibid.
unregulated small enterprises utilized highly toxic paints and solvents without any emissions capture technologies, thereby emitting large volumes of VOCs into the air basin. VOCs are a critical ingredient in the creation of ground-level oxone—a contaminant for which the region was in non-attainment. This project, championed by Dr. Howard Applegate, President of Applied Environmental Services and UTEP professor, proposed a multi-pronged strategy. Applegate had worked collaboratively with universities in Ciudad Juárez for over a decade and had a good network to execute the project. The project group planned to conduct a comprehensive survey of auto paint shops in Ciudad Juárez in order to describe a "typical" auto paint shop. They would also prepare a report on the regulatory framework for these shops and estimate the environmental impact of their activities. They proposed to design a spray-painting stall appropriate and accessible to paint and body shop owners in Ciudad Juárez. Finally, they would present their recommendations to the committee once they gathered all of the data. The project group indicated that they would be seeking funding sources in order to be able to carry out the proposal.244

A second project, titled “Voluntary Toxic Emission Reduction Program,” was modeled after the U.S. EPA’s 33/50 program that targeted a 33% reduction of pollution releases and off-site transfers and a 50% reduction within a specific timeframe. This project group wanted to encourage large companies such as the multinational operations in Ciudad Juárez to reduce 17 high-volume target chemicals identified by the U.S. EPA as posing environmental and health concerns, through pollution prevention. The group hoped to be able to provide companies with technical assistance that would help them determine the most cost-effective methods for reducing

emissions. In doing so, the group was filling a gap created by the lack of environmental inspections and enforcement resources in the region. The group proposed working with Mexican and U.S. officials to develop a unified strategy and find ways to fund this project. They also discussed seeking funding from the American Lung Association to assist with this project.245

The third project, titled "Paso del Norte Air Quality Management District," was championed by Jim Yarbrough of the Region VI, U.S. EPA office, and Dr. Peter Emerson, Senior Economist with the EDF. The proposal recognized the need to coordinate the requisite air programs and policies in order to combat the air quality problems of the El Paso/Juárez / Dona Ana County air basin. This management district would serve to bring local, state and federal government institutions together with local stakeholders through a formalized agreement. The proposed district would begin as a coordinating forum for air policy among the participants, and could then further develop according to the desires of the Committee. The first step was to report the Committee's support for the district to the TACB at their meeting the following day and present a resolution for their consideration at their July meeting. The group would then present the plan to local and regional political leaders along with an invitation to participate in the discussions with the Committee to develop the district framework. After these discussions, the appropriate measures would be taken to formalize the district. The significance of this initiative was that the basin would be locally managed, something which had never been done before. It required the federal regulators to cede some of their authority and trust in the expertise of local residents and experts.246

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245 Ibid. No champion was listed for this project.
246 Ibid.
The idea of establishing a locally managed international air basin was promoted by three professors from The University of Texas at El Paso during the 1980s and was published in an article in the *Journal of Borderland Studies* in 1989. The article, written by Dr. Howard Applegate, professor of Civil Engineering, Dr. Richard Bath, professor of Political Science, and Dr. Jeffery T. Brannon, associate professor of Economics, recommended a series of measures that would help move the two countries toward attainment of their respective ambient standards. They suggested that the region needed to create a comprehensive emissions inventory and establish an air quality accounting system to be managed by a local board of managers. This framework would enable the board to issue operating permits based on existing standards and allow for the development of a transboundary emissions credits trading mechanism. They pointed out that using transboundary emissions credits trading as a means of pollution cleanup in the air basin was less costly than the traditional command-and-control methods employed by government regulators, a very important factor to consider in an economically depressed area such as the Paso del Norte region.247

The fourth project was titled “EPA Border Affairs Office in El Paso.” The project group indicated that at the time all border issues fell under the jurisdiction of both Region VI in Dallas and Region IX in San Francisco. They hoped that by creating this office solely focused on the border and relations with Mexico, policies affecting the border region would involve more input from border communities, leading to better planning and coordination in their development and implementation. They felt that the border office would facilitate interactions with SEDESOL and contribute to ongoing cooperative efforts with Mexico. For Mexican state and local officials, the

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The fifth project, titled “Vehicle Maintenance Program for Maquila Employees,” envisioned a program to assist maquiladora employees with proper vehicle maintenance in light of new emissions control requirements. The project group had concluded that a major cause of the polluting emissions from automobiles was the lack of adequate engine maintenance. The resulting condition of incomplete combustion and excessive fuel usage lead to increased levels of particulate matter, carbon monoxide, and other contaminants. The project group believed that providing technical assistance and equipment for tune-ups for many of these vehicles could significantly reduce their emissions. They focused on employees of maquiladoras in Ciudad Juárez because they were an easy group to reach and therefore a good place to start. The project group would work together with business groups in Ciudad Juárez and El Paso, including

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248 Ibid.
COPARMEX (Centro Empresarial de Ciudad Juárez), AMAC (the Maquiladora Association), and the Sunturions, which perhaps would be willing to sponsor periodic, subsidized maintenance for the employees' vehicles. Although the U.S. EPA had already offered $10,000 in seed money, the project group would need to solicit funds from private sources. In addition, they needed to establish a method to identify both those employees in greatest need of assistance and the vehicles that were emitting the most pollutants. If successful, the Committee could work to expand beyond the maquiladora industry. This project was championed by Jose González, Director of Software Development Division for EDM International, Inc.249

The last project, titled “Reduction of Vehicle Emissions at the International Bridge Crossings,” was headed by Walter Bradley, Executive Assistant to the Director of the TNRCC Office of Air Quality and Mowinski Barrón. This project was particularly important because many studies had shown that emissions from vehicles waiting to cross the international bridges contributed significantly to the total emissions in the region and were therefore an important factor in El Paso’s non-attainment status. It is important to note that Ciudad Juárez was also in violation of air quality standards but there were no regulatory consequences for these violations at the time. In El Paso, business faced limitations to growth and new business had difficulty attaining air permits due to federal and state regulations for non-attainment areas. The committee argued that expediting bridge traffic, while maintaining proper traffic monitoring systems, would significantly improve air quality. Given that the vast majority of port of entry bottlenecks were caused by U.S. inspections protocols for both passenger and cargo vehicles, these efforts were directed primarily at U.S. officials. The first step for the Committee was to identify and contact those individuals who were involved in activities that affected the flow of traffic across the

249 Ibid.
international bridges. They would then invite these individuals to a meeting during which participants could discuss initiatives that might facilitate traffic flows.\textsuperscript{250}

Despite initial conversations about short and long-term projects the Advisory Committee began to work on these six long-term projects, which they considered good starting points toward attaining healthier air. The project leadership included both U.S. and Mexican representatives from the private, public and non-profit sectors, depending on the nature of the project and the country in which the project was taking place. While this was a binational initiative, it is important to keep in mind that it was still an advisory group to a U.S. state agency and the funding for many of the projects they worked on came from the U.S. government or foundations. It is also critical to acknowledge that without the committed participation of the Mexican members, the initiative would never have moved past the conceptual stage.

When the Advisory Committee reconvened on July 14, 1993, five of the project champions updated the Committee on their progress. Dr. Howard Applegate and Conrado Diaz, of the Instituto Tecnológico de Ciudad Juárez, reported that they had secured partial funding for their study of paint and body shops in the region. They said they had already identified 250 paint shops in Ciudad Juárez and they were working with another Committee member, Robert Gray, of Accugraph Corporation, to create a computerized map that included all paint and body shops in El Paso and Ciudad Juárez. Data for the paint and body shops in El Paso was available because state and local authorities regulated these operations. The project leads indicated that they were gathering emissions inventory data from the 250 locations in Ciudad Juárez. That would help Ciudad Juárez’s efforts to create a comprehensive emissions inventory and, combined with El

\textsuperscript{250} Ibid
Paso’s data, enable the region to have a better understanding of the flows of VOCs between the two cities.251

Danny Vickers reported that the Voluntary Toxic Emissions Reduction Program was actively developing its proposal and that they had received indication from a U.S. EPA official that they could apply for $50,000 in support of this program. Vickers also indicated that they were communicating with Mexican officials regarding this initiative. Dr. Pete Emerson and Chris Shaver, both from the EDF, reported that the Paso del Norte Air Quality Management District project group distributed a draft working paper for review by the Committee. They also indicated that TACB Chair Kirk Watson had presented a draft letter to Gov. Ann Richards for either President Bill Clinton or EPA Administrator Carol Browner, supporting the creation of this international air quality management district (IAQMD). Raul Munoz, of the El Paso City-County Health District, reported that the EPA Border Affairs Office project had also submitted a draft letter to Chairman Watson for Governor Ann Richards to send to President Bill Clinton in support of the El Paso location for the EPA Border Affairs Office.252 Jose González, with EDM International, indicated that they had expanded the Vehicle Emissions Program for Maquiladora Employees project to include employees of any industry. The group had already secured support from COPARMEX (Centro Empresarial de Ciudad Juárez) and were seeking support from other industry groups. The U.S. EPA also committed to providing $10,000 to support this project. After only one month in existence, the project teams were already making progress.253

In addition to the progress reported on the Committee’s projects, this meeting was noteworthy because there were representatives of the Mexican Procuraduría Federal de Protección al Ambiente (PROFEPA) in Chihuahua and the State of Chihuahua Office of Urban Development and Ecology in attendance to address the Committee. In Mexico at that time, the federal government had regulatory jurisdiction over all fixed source emissions as well as the air quality monitoring facilities. This caused significant frustration among state and local officials who were unable to address environmental issues their states and municipalities. Miguel Orozco, with PROFEPA, attempted to address some of this frustration by providing an overview of SEDESOL’s role in environmental regulation and the ongoing decentralization efforts that would shift the responsibility for emissions inspections and monitoring to the states. He also shared that they were in the process of developing an emissions inventory of the maquiladoras in Ciudad Juárez as well as conducting aerial inspections in search of clandestine hazardous waste dumps. Francisco Jose Prieto, with the State of Chihuahua Office of Urban Development and Ecology, indicated that the state was moving forward with mandatory vehicle inspections in January 1994. He also shared that it was his opinion that officials in Mexico City and Washington D.C. did not have an idea of the extent of the environmental problems in the border. He shared Chihuahua Governor Barrio’s support for the Committee’s projects and offered to petition federal authorities for support on their behalf. The presence of these Mexican environmental officials at this meeting provides a strong indication that they had taken notice of this binational effort. At least at the state level, they were already comfortable expressing support for the collaboration.254

When the Committee met again on August 25, 1993, almost 50 attendees were present to hear that there was significant progress to report regarding what was now being referred to as the

254 Ibid.
International Air Quality Management District (IAQMD) for the El Paso/Juárez/Doña Ana County region. Danny Vickers and Dr. Pete Emerson shared that at the request of TACB Chair Kirk Watson, Governor Ann Richards had sent a letter to President Bill Clinton on July 26 requesting his support for the IAQMD. They had subsequently learned that the president had directed the EPA Administrator to designate a deputy administrator to work on developing the IAQMD. Vickers also indicated that he and Jose González had met with Alfonso Murgía from Chihuahua Governor Francisco Barrio’s office on July 30th and had received his commitment that the governor would send a letter of support for the IAQMD to Mexican President Carlos Salinas de Gortari. 255

The Committee members discussed the possible frameworks for the development of the IAQMD, including utilizing a memorandum of understanding tied to an existing La Paz Agreement Annex or developing a new Annex to the La Paz Agreement. Based on the discussion and research done by various committee members, Archie Clouse, the TACB Regional Director in El Paso, suggested that the most effective approach would be to propose Annex VI to the La Paz Agreement. U.S. EPA Region 6 representatives Jim Yarbrough and Dr. Stan Meiburg both spoke about the importance of the Committee’s “unique and innovative” work, noting that there was a “long-standing need” for such collaborative efforts along the U.S.-Mexico border. They reiterated U.S. EPA’s support for the IAQMD and indicated that the initiative had the advantage of having attained high profile interest. PROFEPA representative Miguel Orozco similarly communicated their support. He indicated that President Salinas had recently visited Ciudad Juárez and that PROFEPA Director Salvador Oñate had instructed him to provide support for the

development of the IAQMD. Although the U.S. EPA had been supportive of the IAQMD concept all along, Mexican federal officials had not indicated their support publicly before this meeting. Given the importance of this project to the region’s air quality management and the significant support and traction that the IAQMD was gaining, Danny Vickers recommended that the Committee focus its efforts primarily on this project. That said, other project champions reported progress and plans to continue pursuing their objectives as well.\footnote{256}

Throughout the summer of 1993, the Advisory Committee worked to establish the necessary binational networks and gain the government recognition needed in order to advance its agenda. Mowinski Barrón reported on the Committee's progress to the TACB in June and August, requesting TACB staff support to amplify the efforts of Committee members on specific projects. In his final weeks as TACB Chair, Watson sent letters to the state officials in Chihuahua and New Mexico as well as U.S. Port of Entry officials, encouraging their support for TACB Advisory Committee projects. On the last day of his chairmanship, he sent a letter to the U.S. EPA Acting Regional Administrator expressing the TACB’s endorsement of the IAQMD and urging the support of Region IV EPA staff. Kirk served as an important champion, but his departure did not diminish the momentum of this frontera coalition. A fledging epistemic community, the Task Force was now organized, connected, and creating synergies for the improvement of the region’s air basin specifically and the management of transboundary natural resources more broadly.\footnote{257}

\footnote{257} Dr. Elaine Barrón, M.D., “Report to the Texas Air Control Board on the Activities of the TACB Advisory Committee on El Paso/Juérez Air Quality,” June 18, 1994 and August 30, 1993. Kirk Watson, Chairman of Texas Air Control Board, to Chihuahua Gov. Francisco Barrio Terrazas, June 10, 1993; Kirk Watson, Chairman of Texas Air Control Board, to Cecilia Williams, Chief Air Quality Bureau, New Mexico Environmental Department, May 14, 1993; Kirk Watson, Chairman of Texas Air Control Board, to Arthur Pitts, El Paso Port Director, U.S.
On September 1, 1993, the state of Texas merged the TACB with the Texas Water Commission to form the Texas Natural Resources Conservation Commission (TNRCC.) This merger, of course, had implications for the TACB Advisory Committee. Mowinski Barrón would not be representing El Paso within this agency board. Nevertheless, TNRCC Commissioner Pam Reed sent Mowinski Barrón a letter requesting that she stay on as chair and offered the continued support of the TNRCC. She also recommended changing the name of the group to the Task Force on Paso del Norte Air Quality (Task Force.) This name, Reed suggested, "reflects the active role of the group and the regional nature of the group's activities and membership."

In alignment with its binational focus and perhaps foreshadowing its changing role, when they met again on October 7, 1993, they assembled at the Presidencia Municipal in Ciudad Juárez. During this meeting, Mowinski Barrón discussed the recent developments with the state environmental agency and the implications for the group. She shared Reed’s commitment and her suggestion for the name change. The members adopted the new name and the Task Force continued its work, now with the support of the TNRCC.

During that same meeting, Dr. Stanley Meiburg with U.S. EPA Region VI shared that a subgroup of Task Force members had developed a proposed Annex VI to the La Paz Agreement, based on the IAQMD draft proposal that had been presented to the group during the July 14th meeting. That proposal had received the support and endorsement of the TACB during its final meeting in August and Chairman Watson had requested that the TNRCC staff and Task Force

\[\text{Department of the Treasury, U.S. Customs Service, June 17, 1993; Kirk Watson, Chairman of Texas Air Control Board, to Joe D. Winkle, Acting Regional Administrator, U.S. Environmental Protection Agency, August 31, 1993. Copies with author.}
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continue to advocate for the IAQMD. Albion Carlson, with the New Mexico Air Quality Bureau, shared that the IAQMD had the support of the New Mexico Secretary of State and that they expected a Memorandum of Support from the state legislature soon. Meiburg indicated that the Region VI Office sent the IAQMD proposal to U.S. EPA headquarters for review. Following a review and revision process that could take approximately one month to complete, the proposal would be shared with the Task Force and sent to the U.S. State Department to initiate discussions with Mexico.\textsuperscript{260}

Task Force members also reported on other projects that were making progress. Robert Gray, with Accugraph Corporation, and Jose Salcido with EDM International, reported that the auto and paint shop study of the region was near completion and the data from this study was being incorporated into the environmental database for the region. Chris Kennedy, a Border Specialist with the TNRCC, added that the Voluntary Toxic Emission Reduction Program group was working with the U.S. EPA and the El Paso Foreign Trade Association to host a workshop on October 28 that would feature regional pollution reduction measures taken by General Electric, General Motors, Ford, Chrysler, Briggs & Stratton, and AT&T. Dr. Erin Ross with New Mexico State University was one of the primary organizers for this educational effort aimed at helping companies reduce emissions.\textsuperscript{261}

Finally, Francisco Núñez, with the Comité Ecológico de Ciudad Juárez reported on a cooperative effort between the Texas Transportation Institute at Texas A&M, the Instituto Tecnológico de Ciudad Juárez, the Universidad Autónoma de Ciudad Juárez and the municipal government to obtain vehicle miles traveled and speed data for the city that would assist them in

\textsuperscript{260} Ibid.
\textsuperscript{261} Ibid.
developing an emissions inventory. This data would also be helpful in developing vehicle emissions reduction strategies. EDM International volunteered to process the survey data into the appropriate format to facilitate the process. They anticipated this TTI-led effort would take approximately one year to complete. Although the origins of this project preceded the Task Force, the project benefited from the support and contributions of Task Force members like Danny Vickers, who volunteered his company to assist with the data processing. These ongoing studies were another key component of the public/private sector cross-border efforts to create a comprehensive emissions inventory for the air basin. With these substantive projects in progress and momentum building in support of the Task Force’s priorities, the group agreed to reconvene on November 18.

When the Task Force met again in November, the U.S. Congress had just approved NAFTA and the environmental side agreements. The Task Force received several project updates, but they focused their attention on their two biggest projects - the IAQMD and the Border Region EPA Office. Jim Yarbrough with EPA Region 6 explained that the IAQMD proposal was submitted to the EPA Office of International Activities, which would disseminate the proposal to other EPA offices for review. Having heard an update that sounded much like the report that EPA gave the previous month, Task Force members began to press Yarbrough for additional information. Vickers asked Yarbrough who was in charge of tracking the proposal

262 Texas Air Control Board, Carl Snow, Emissions Inventory Division, “Memorandum Regarding Ciudad Juárez Emissions Inventory,” Austin, Texas, August 31, 1993. U.S. EPA Border Office Archive. The Ciudad Juárez Emissions Inventory Study was a part of a larger cooperative effort between the U.S. EPA and the Mexico Secretaría de Desarrollo Social to address air quality in the region. The impetus for this was the non-attainment status of El Paso and the charges under the La Paz Agreement to address transboundary air pollution. Funding for the project came from the U.S. EPA and through congressional appropriations.

through the review process and suggested that they invite that/those individual/s as well as their SEDESOL counterparts to attend their next Task Force meeting. Yarbrough provided the names of two individuals in the EPA Office of International Activities who were working with the project. Dr. Pete Emerson with the EDF provided the name of a SEDESOL representative who could also be invited. This was followed by additional discussion regarding the October meeting of the Binational Coordinators in Ensenada, Baja California. The biannual meeting, required by the La Paz Agreement, was attended by EPA Administrator Carol Browner and SEDESOL Secretary Luis Donaldo Colosio. According to the representatives from TNRCC and PROFEPa who were in attendance and shared a copy of a joint communique issued following the meeting, the Task Force and its projects were mentioned during the meeting and were included in the initial list of priorities to be considered by the Binational Coordinators. This visibility for the Task Force projects was important because it reflected that the top environmental officials for both countries acknowledged the group’s advocacy and initiatives. This was a necessary step in building credibility and support in both Washington D. C. and Mexico City.264

The Task Force quickly pivoted to discussions about the establishment of the U.S. EPA Border Region Office. Yarbrough told the group that he had not heard anything about this project and added that President Clinton had indicated that the EPA would sustain a 7% budget cut that might affect staffing. Nevertheless, Yarbrough reiterated that the Border Region Office was a priority. Vickers once again asked whom they should contact at EPA to lobby for this office. Yarbrough suggested the same individuals who were working on the IAQMD. This pressure

from the *fronterizos* on the Task Force regarding the timeline and the pace of progress was a necessary reminder for federal bureaucrats, no matter how well intentioned, that the air pollution problems in the region needed swifter responses.265

Over the next few months, a contingent of Task Force members partnered with the Greater El Paso Chamber of Commerce and elected officials from the region to lobby key Washington D.C. leaders for the EPA Border Office and either the North American Development Bank (NADBANK) or the Border Environment Cooperation Commission (BECC) to be located in the region. At that time, cities including San Diego, San Antonio, and Mexico City were similarly lobbying for the placement of the NADBANK and the BECC. On the Mexican side, the EDF worked with SEDESOL officials in Mexico City to keep the work of the Task Force on the forefront amidst the NAFTA-related changes. Locally, the Ciudad Juárez Chamber of Commerce and several other industry groups lobbied Mexican President Salinas de Gortari through a letter writing campaign to place the BECC in Ciudad Juárez.266

It is worth noting that while the political lobbying and jockeying for the placement of these institutions was ongoing, California was in the midst of the anti-immigrant campaign for proposition 187, championed by republican Governor Pete Wilson. Proposition 187 sought to limit public resources and services available to undocumented immigrants in the state. The campaign portrayed Mexican immigrants as scofflaws who were dependent on public safety net programs and draining state coffers. The Mexican government was vocal in its condemnation of

265 Ibid. According to a side note in the minutes, there were subsequent discussions between the Greater El Paso Chamber of Commerce, the Foreign Trade Association and the Sunturions to commit funds to lobby for NAFTA-related offices to be located in El Paso. Given the involvement of Task Force members in these organizations, advocacy efforts and resources were aligned to strengthen the lobby efforts and leverage their collective efforts to bring additional environmental resources to the Paso del Norte region.

266 Ibid.
the campaign and the overt racism that was on display throughout the state. They warned of the long-term damage the campaign would cause to binational relations. With San Diego/Tijuana being the only other large community on the U.S./Mexico border, El Paso/Ciudad Juárez stood to gain from the proposition 187-related fallout as NAFTA-related resources were allocated.  

In spring 1994, the Task Force faced a couple of significant organizational changes and existential questions. They learned during their March meeting that due to structural changes within the TNRCC, the agency would no longer provide support to the organization. This included administrative support that had been an important organizational tool. The Task Force contemplated whether it should assume an action oriented role or an informative/facilitative role. Vickers asked the group to think about this and be prepared to make decisions at the next meeting. Mowinski Barrón concluded the meeting by announcing that due to time commitments with her practice and other activities, she was stepping down as chair of the Task Force. She asked Vickers to serve as interim chair until the Task Force could make nominations and vote for a new chair. She also suggested that the Task Force formalize the structure and operations of the organization, particularly because there was no established process by which the group would nominate and elect a new chair. In order for the organization to continue as an independent entity, they needed to develop their own operational and legal framework in order to continue their work.

During their May meeting, Vickers announced that he had received overwhelming support for the Task Force to remain as action oriented as possible and to have a long-term role.

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in the region. In line with that sentiment, he distributed a draft mission statement for the members' consideration as they deliberated about the Task Force’s transition to a formal independent organization. Christopher Johnston, an El Paso attorney, shared some organizational options for the group to consider. They discussed the pros and cons of incorporating the group as a non-profit entity versus a foundation. If it filed as a non-profit group, under section 501 (c)(3) of the Internal Revenue Code of 1986, the group could face restrictions regarding lobbying activities. As a foundation, Johnston informed the group, there would be "difficult fiduciary technicalities," in addition to other restrictions. Another issue that needed to be addressed was whether a sister organization could be set up in Ciudad Juárez similar to whatever was agreed upon on the American side, since they could not create one transboundary non-profit organization. Johnston advised the group to work as a non-profit organization operating in concert with other area organizations. Vickers suggested to the group that the ideal structure would be one in which the organization could get things done without being overly encumbered by government restrictions. The group eventually decided to establish itself as two non-profit organizations, one in Mexico and an equivalent organization in United States. Vickers said that he hoped to have a charter, which would provide direction for the next five to ten years for the Task Force by the July meeting. He also asked the group consider selecting a chair, given that he was still serving in an interim capacity.  

In addition to the decisions the Task Force had to make regarding their organization structure, they also faced the challenge of staffing support. They had previously received staff support from the TACB and the TNRCC, but with the shift in their structure that would change. Vickers shared that he had spoken to TNRCC Commissioner Pam Reed regarding their

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continued need for support and that she had promised to look into assigning a TNRCC staff person to help the Task Force develop its work plans and facilitate the implementation of their projects. In the meantime, Dr. Wesley Leonard of the University of Texas at El Paso’s Center for Environmental Resource Management and Dr. Peter Emerson with the EDF agreed to provide project support for the Task Force. Although these were mundane operational details, they were critical to the continued work of the Task Force. 270

As the Task Force reached its one year anniversary as a coalition, their projects and policy initiatives reflected the extensive collaborations and coordinated efforts by stakeholders from the private and public sectors interested in improving the region’s air quality. These stakeholders included researchers from the region’s academic institutions but they also included researchers from national laboratories and universities hundreds of miles away who learned about the initiatives in the region and wanted to help. NGOs such as EDF and civic groups in El Paso and Ciudad Juárez all assisted by bringing resources to the Task Force projects. Government officials from the U.S. EPA, SEDESOL and many state and local agencies were also instrumental in the collaborations and implementation efforts. There were also many business people deeply embedded in the Task Force. Whether the Task Force initiated the projects or not, it became a hub for like-minded professionals with diverse competencies to engage in multi-sectoral, binational collaboration and coordination that created trust and synergies around air quality initiatives. After a year of work, the Task Force had become a fronterizo-led epistemic community focused on the Paso del Norte air quality and border air quality governance.

270 Ibid.
Over the course of the next two years, this epistemic community would continue to expand its network and focus its efforts to change the state of air quality and governance in the region through innovative cross-border partnerships. While they continued to work on their priority projects including the IAQMD and the EPA Border Office, they also engaged other opportunities and partnerships as they solidified their role and expanded their capacity as an organization. This included a cooperative effort between the Task Force, the Alternative Fuels Council, the Rio Grande Council of Governments, and the El Paso Metropolitan Planning Organization that produced a $500,000 alternative fuels conversion grant initiative.\(^{271}\)

Another example was vehicle emissions inspection project managed by the Dirección Municipal de Ecología de Ciudad Juárez. This initiative, which was launched with support of the U.S. EPA and the State of Texas to curb vehicle emissions from the aging vehicle fleet, had inspected 158,068 private vehicles and 1,926 public transportation vehicles. In conjunction with this inspection project, the Dirección Municipal de Ecología de Ciudad Juárez was collaborating with Colorado State University, El Paso Community College, and three Technical Vocational Auto-Mechanics Schools in Ciudad Juárez to launch a “Diagnostic Centers Project” to train auto mechanics to repair emissions systems and reduce the cost of those repairs for vehicle owners. Smog Supply and Equipment, a diagnostic equipment manufacturer, donated three analyzers and EDF agreed to assist with the expenses related to the importation of the equipment. This project was remarkable given the number of partners that were coordinating to address a fundamental and unmet need in Ciudad Juárez.\(^{272}\)

\(^{272}\) Ibid.
During their Summer Task Force meeting, EDF’s Christine Shaver shared that the U.S. EPA had accepted the IAQMD proposal as Annex VI to the La Paz Agreement and would be moving it to the State Department within the next month. The group also heard from Pat Cupp, from the U.S. EPA, that the agency was planning to fund a number of projects including pollution and traffic reduction studies in Ciudad Juárez and Doña Ana County, vehicle emissions reductions in Ciudad Juárez, support for TNRCC’s Air Quality Program monitoring sites, and a workshop on the International Air Quality Management District. The TNRCC’s Sally Gutierrez also shared that they were creating an EPA-funded position for a new TNRCC staff person in El Paso. She said that this project manager would assist the Task Force in its projects and act as the coordinator for other binational cooperative efforts. All of this federal funding was responsive to Task Force’s requests for support and intended to provide continuity to the ongoing projects and collaborative efforts in the region. It was also a preface for developments related to the Task Force’s request for an EPA Border Region Office.273

The positive July announcements were followed by mixed news at the September Task Force meeting. EDF’s Dr. Pete Emerson reported that the IAQMD Annex VI proposal had been discussed two days earlier in a meeting in Mexico, but that there was no official word from Mexican Officials regarding next steps. Vickers reiterated how critical the establishment of this district was to creating a cross-border pollution reduction and enforcement program. Unfortunately, progress on the IAQMD was very slow and the process for approval was shrouded in mystery and uncertainty. This disappointing update was followed by a very significant announcement and victory for the Task Force. Nelly Rocha announced that the U.S. EPA Border Office was opening in El Paso and would be staffed by seven people by the summer.

273 Ibid.
of 1995. Rocha shared that the Border Office would be focused on environmental issues along the entire border and that they were in the process of developing a Border Action Plan. The meeting concluded with Vickers addressing an internally stalled task - he urged the Task Force to clarify the organization’s goals and operational structure in order continue to be viable and productive. 274

Having successfully enlisted the support of the regional community and Texas Governor Ann Richards, followed by a year-long lobbying effort to convince President Bill Clinton and EPA officials in Washington D.C. to establish an U.S. EPA Border Region Office in El Paso, the Task Force achieved one of its top goals. There are many factors mentioned earlier that went into the decision to open the EPA Border Region Office in El Paso and by no means is the Task Force to be solely credited for this decision. That said, the Task Force capitalized on the political momentum associated with the passage of NAFTA and mounted a successful lobbying campaign. On November 2, 1994, the Task Force members celebrated the inauguration of the EPA Border Region Office in El Paso. 275

They took advantage of this inauguration to meet with EPA Administrator Carol Browner and her staff. Danny Vickers, Francisco Núñez, Jesus Reynoso, Carlos Rincón, Juan Sanchez, and Pablo Salcido discussed the IAQMD proposal and its importance to the region’s air quality. Vickers elaborated on the ongoing projects in the region, but emphasized that significant air quality improvements would require region-wide programs and policies that would be facilitated

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275 Dr. Carlos Rincón, Program Director, Environmental Defense Fund, interview by author, El Paso, TX, November 20, 1995.
by the IAQMD. Browner reportedly expressed her support and enthusiasm for the proposal and pledged to pursue implementation.²⁷⁶

In January 1995, when the Task Force met again, the IAQMD was the dominant topic of discussion. Danny Vickers shared Browner’s commitment to be a champion for the creation of the binational district. He also indicated that he had spoken to a U.S. Department of State representative and his impression was that the Task Force needed to do more work to convince them that the IAQMD was necessary. The political environment in Washington had changed as well. The November elections had yielded a republican majority in Congress, therefore Clinton Administration officials would likely be more cautious about bold policy initiatives like the IAQMD. EPA’s Jim Yarbrough shared that the U.S. EPA had met with the Department of State and he confirmed that they had expressed concerns regarding federal jurisdictional authority and the prospect of ceding that to a regional body. Yarbrough indicated that they could allay these concerns if they promoted the IAQMD as an advisory board for the existing governments rather than as an independent body with transboundary governance authority. He suggested that additional meetings were necessary in order to work through these issues and finalize Circular 175, which would serve as the notice of intent to negotiate with Mexico on this matter. Roberto Fernández, a Mexican attorney, reminded the group that it was a good time to establish contacts within the Mexican agencies to foment support for the IAQMD, considering that they had lost a great advocate with the recent assassination of Luis Donaldo Colosio. Furthermore, with Mexico

presidential elections concluded, the Zedillo administration had restructured and made new
government appointments.277

The Task Force also continued its conversation regarding the need to formalize its
structure as two parallel, non-profit entities in the U.S. and Mexico. Francisco Núñez urged the
group to push this effort forward. He reminded the attendees that the progress made in Ciudad
Juárez in air quality monitoring was due to the binational cooperation between EPA and
SEDESOL as well as the state and local stakeholders. Having a formalized structure, Núñez
argued, would help both sides work together more effectively. His sentiments echoed those of
Lydia Villalobos Prieto, with the State of Chihuahua’s Departamento de Ecología. Villalobos
credited much of the State’s progress made in environmental regulation to the collaborative
initiatives taking place in Ciudad Juárez. Due to the lack of support and resources coming from
federal authorities, Villalobos said the state was applying what they were learning from Ciudad
Juárez to the rest of the state. As such, the Task Force’s work in building environmental capacity
and infrastructure in Ciudad Juárez was creating benefits to the entire state. Vickers also
reminded the group that having the non-profit status would help the organization raise money for
its initiatives. Roberto Fernández, who was assisting with the organization structure in Ciudad
Juárez, provided details regarding next steps for the process. He also stressed how important it
was to get this structure formalized so that the group could more effectively advocate for the
IAQMD.278

Archive. United States Department of State, “Circular 175 Procedure.” https://2009-
278 Ibid. Lydia E. Villalobos Prieto, Jefe del la Oficina de Prevención, Control y Saneamiento Ambiental,
Departamento de Ecología, Estado de Chihuahua, interview with author, September 14, 1995. Chihuahua,
Chihuahua.
Throughout 1995, the Task Force focused its efforts primarily on the adoption of an IAQMD, with peripheral attention to the organizational structure as well of the other ongoing projects that various members championed. Vickers worked closely with attorneys Christopher Johnston and Roberto Fernández to solicit input from Task Force members regarding the desired organization structure. They finally compiled their articles of incorporation under a new name: Paso Del Norte Air Quality Task Force Inc. in the U.S. and Fuerza Ciudadana Pro-Calidad del Aire Paso del Norte A.C. in Mexico.279

The articles would apply to the sister corporations created in both El Paso and Ciudad Juárez in order to create mirror institutions. Their purposes as corporations were the following:

- Serve as a forum for discussion of public policy concerning air quality;
- Facilitate the planning, communications and coordination among all organizations that are responsible for improving air quality;
- Support, prioritize and actively promote programs that contribute to air quality;
- Monitor the progress of all organizations that are responsible for improving air quality;
- Raise funds from local, state, national, and international organizations for air quality projects;
- Educate the public on air quality and foster a grass roots movement to support the initiatives of the Task Force;
- Support the creation of an International Air Quality Management District in our Community.280

Under this charter the membership was open to all applicants interested in the corporation and each member would be entitled to one vote on each matter that was submitted to the vote of the membership.

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279 A.C. means Association Civil, the designation for a non-profit corporation in Mexico. Two non-profit organizations with identical articles would be established on either side of the border due to legal restrictions regarding bi-national entities. Therefore, the "corporation" refers to one entity composed of two sections, one in Mexico and one in the U.S.

members. The Corporation called for seven directors from each section on its Board, who would manage the business and affairs of the corporation. The Corporation would also have elected officers, among them, a President, one or more Vice-Presidents, a Treasurer, and a Secretary.

Aside from the annual meeting, either the President or the Directors could call special meetings as deemed necessary. The Board of Directors could form committees to work on specific projects exercising the authority delegated to it by the Board. These committees would have chairs appointed by the President or Board of Directors. The officers and positions within these committees would have a one year terms. These and other specifics were outlined in the Articles of Incorporation and Bylaws.281

Despite the progress made in defining the charter and bylaws, the Task Force took a long time to initiate the legal process to become a non-profit corporation in both countries. This delay was in part because Task Force members were focused on advancing the IAQMD and other projects. The other reason, according to Vickers, was that the Task Force struggled to determine who would sit on their first Board of Directors. The nomination process seemed to be a sensitive one, as no one wanted to offend other members by excluding them from the board. This same situation presented itself when Vickers, the Interim Chair, announced that he was stepping down by March 1995. Vickers hoped the group would nominate a Mexican member to be the next chair, but here again it seemed preferable not to nominate anyone rather than exclude and possibly offend someone who could be a candidate. When the organization finally filed its articles of incorporation in May 1996, Vickers continued as Chair of the Task Force.282

281 Ibid.
Despite these delays, the Task Force finally set forth the list of the first members that would sit on the Board of Directors for both the Mexican and the American sections. The Task Force chose these individuals based on past contributions to the group projects and the level of engagement within the organization. They represented different sectors of the community allowing for a board representative of the balanced public and private sector involvement in the Task Force. These people were also required to be residents of the Paso del Norte region. Unfortunately, this meant that individuals who had been very active in the organization from its inception, such as Dr. Peter Emerson of the EDF and Dr. Jim Yarbrough of the U.S. EPA who were not area residents, were unable to serve as directors. Nevertheless, this was an important caveat to make because they wanted the direction and work of the Task Force to be driven by *fronterizos*.²⁸³

The Mexican section of directors included: Guadalupe Arizpe de De la Vega, President of FEMAP; Roberto Fernández Reyes, Ciudad Juárez lawyer; Dr. Octavio E. Chávez, Resident Advisor for the International City/County Management Association; Francisco Núñez, Director of Water Treatment with the Junta Municipal de Agua y Saneamiento in Ciudad Juárez; Dr. Carlos Rincón of the Environmental Defense Fund; and Jose Antonio González, a business owner. The American section of directors included: Danny Vickers, of EDM International; Tom Martin, Environmental Director for ASARCO; Dr. Elaine Mowinski Barrón, El Paso physician; Archie Clouse, Air Program Manager for the TNRCC; Dr. Charles Groat, Director of the Center for Environmental Resource Management at the University of Texas at El Paso; Dr. Erin Ross, of the New Mexico State University College of Business Administration; and Jesus Reynoso of the El Paso City-County Health District.

²⁸³ Ibid.
For almost every nominated board member, their leadership in the Task Force is clear from the meeting minutes and from interviews with several of them. It is unclear why the group nominated Tom Martin to serve on the board of directors because the meeting minutes do not reflect any significant level of involvement in Task Force Projects since its inception, although meeting sign-in sheets show regular attendance. Given the scrutiny that ASARCO was under at the time, the ASARCO representative may have pushed for participation on this board in order to signal to federal and state regulators the company’s willingness to help address regional air quality issues. He may have also participated in order to deflect any initiatives targeted at ASARCO. This would have been consistent with the expectations of individuals in those roles, representing highly polluting industries. In interviews with Task Force leaders Barrón and Vickers, both stated that the success of the organization was due to their inclusion of all stakeholders for the purposes of problem solving, rather than in placing blame on specific polluters. They felt that inclusion of the region’s industry was very important to developing productive solutions. Of course, those interviews took place long before the community learned of the egregious illegal incineration of toxic chemicals at ASARCO’s El Paso site from the early 1990s through 1997. It is unlikely the Task Force would have nominated Martin if they had known of the atrocities that ASARCO was perpetrating on the air basin at that time.  

From among these fourteen directors, the Task Force was to elect a president, secretary, and treasurer to carry out the responsibilities outlined in the charter. They also tacitly assumed that the presidency would alternate between a Mexican and an American member during future elections. (The board did elect a Mexican chair when Vickers completed his term.) In early May 1996, Christopher Johnston began the application process with the Texas Secretary of State for

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official status as the Paso del Norte Air Quality Task Force Inc. Simultaneously, Roberto Fernández began the process on the Mexican side in order to become the Fuerza Ciudadana Pro-Calidad del Aire Paso del Norte A.C.²⁸⁵

The incorporation of the Paso del Norte Air Quality Task Force was initiated just as their efforts to secure adoption of the IAQMD were coming to fruition. As mentioned earlier, momentum and support in Washington waned in late 1994 when republicans secured majorities in Congress and the Clinton Administration’s agenda stalled. In Mexico, the federal elections had also brought about new political appointments in critical administrative positions. The Task Force mobilized in the first quarter of 1995 to send letters to new SEMARNAP officials in Mexico City to build awareness and support for the IAQMD proposal. In late June 1995, the Annex V Binational Working Group (Air Work Group) met in Mexico City, as they were required to do twice a year under the La Paz Agreement. During this four-day meeting, the Air Work Group dedicated an afternoon of discussions to the IAQMD proposal. The American section presented the Mexican section with the tentative draft of Annex VI that had been cleared by the U.S. Department of State through their Circular 175 procedure. The Air Work Group agreed to meet again in August to include State Department and Secretaría de Relaciones Exteriores officials in a formal discussion solely about the IAQMD.²⁸⁶

On August 25, 1995, representatives of the EPA, SEMARNAP, the State Department, and the Secretaría de Relaciones Exteriores held a formal meeting in Washington D.C. to discuss the creation of the IAQMD. From this meeting emerged several milestones in its development.

First, the group officially recognized the existence of the Paso del Norte Air Basin as a geographic region rather than using the names of the individual cities that artificially divide the region. This recognition was the first step in getting the federal governments to acknowledge the need for coordinated policymaking and truly bilateral efforts to improve the air quality. The group agreed that the structure of the IAQMD was a viable approach to this complex problem; however, the semantics of the proposal were problematic for the Mexican representatives. They were concerned that the use of the words "international" and "district" in IAQMD implied a type of agreement that would require congressional review, thus involving a long, drawn-out process. They also preferred to draft the agreement as an Appendix to the existing Annex V, rather than creating an Annex VI, which could also raise unnecessary political resistance. The Mexican delegation assured those assembled that if the agreement was drafted as an appendix not an annex, an "air basin" not a "district," and using "Paso del Norte" rather than "international" in the name of the entity, then they would have the authority to hold negotiations and approve the agreement. This changed the wording to an agreement to establish an appendix to Annex V that would form the Paso del Norte Air Quality Management Basin (PNAQMB). Both delegations took note of the concerns of the other side and agreed to work together over the coming months to produce an agreement acceptable to both parties.  

Many Task Force members were disappointed with the shift from a district to an advisory body because they feared it would amount to another meaningless committee. They all would have preferred that the original wording remain intact, but they realized that there was value in having strong local representation within the resulting institution. However, this too was problematic for the Mexican side, which expressed its uneasiness with the idea of negotiating

with non-governmental representatives. This was not a common practice in Mexico at the time. In response to the apprehensiveness on the part of Mexican Section officials, the EDF reached out to the Ford Foundation in Mexico City to request their assistance in setting up a meeting for the Task Force. The Ford Foundation was an ally because they had provided EDF funding to support the Task Force’s lobbying efforts for the IAQMD.288

On October 9, 1995, Task Force members traveled to Mexico City to meet with SEMARNAP officials Dr. Adrian Fernández Bremauntz, Director General de Gestión e Información Ambiental and Dr. Ricardo Hernández, Director General de Coordinación de Asuntos Internacionales. Task Force members in attendance included the following Mexican representatives: Guadalupe Arizpe de De la Vega, President of FEMAP; Roberto Fernández, a Ciudad Juárez Lawyer; Dr. Octavio Chávez, with ITESM and COPARMEX; Dr. Enrique Suarez, Executive Director of FEMAP and CANACO; Alfonso Cota, a consultant; Francisco Núñez, with the Ciudad Juárez Municipal Government, and Dr. Carlos Rincón, with EDF. Representing the U.S. side were Dr. Elaine Mowinski Barrón, El Paso physician; Dr. Peter Emerson and Christine Shaver, both with EDF. The Task Force members hoped this meeting would help them build rapport between the Task force and the Mexican Section of the Air Working Group. The Task Force members conveyed their interest in pursuing a partnership with the federal government rather than acting autonomously. This interaction was positive because participants were able to air their apprehensions and have those concerns addressed directly. For the Task Force, their principal question related to the extent to which the Mexican Government would allow them to become involved in the negotiation process. The SEMARNAP officials responded

that they would allow Task Force members who were state and local government officials to participate in the next round of negotiations.289

For the next few months, all of the adjustments made to the original IAQMD proposal were made through the exchange of drafts rather than holding formal negotiations. Exasperated by the lack of progress, Task Force Chairman Danny Vickers described the pace of negotiations as that of a “snail on a turtle’s back.” On February 22, 1996, Task Force members once again reached out to Mexican officials to urge their support for the IAQMD. In a six-page letter, the Task Force reiterated the importance of creating an action-oriented governance mechanism that would enable cross-border monitoring and mitigation strategies.290

ADOPTION OF THE JOINT ADVISORY COMMITTEE ON AIR QUALITY IMPROVEMENT FOR THE EL PASO- CIUDAD JUÁREZ- DONA ANA COUNTY AIR QUALITY MANAGEMENT BASIN

During the last week in March, U.S. and Mexican negotiators reconvened in El Paso to further the IAQMD discussions. The two parties sought the input of Task Force members and finalized the details of the agreement to create a transboundary air quality management basin in the Paso del Norte region. The agreement was adopted at the U.S.-Mexico Binational Commission Meeting in Mexico City on May 6 and 7, 1996, when it was signed by Mexico's Secretary of Foreign Affairs Angel Gurria and U.S. Secretary of State Warren Christopher. Appendix 1 to Annex V, the final designation of the agreement, created the Joint Advisory

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289 Paso del Norte Air Quality Task Force to Dr. Adrian Fernandez Bremauntz, Director General de Gestión e Información Ambiental and Dr. Ricardo Hernandez, Director General de Coordinación de Asuntos Internacionales, SEMARNAP, October 25, 1995. U.S. EPA Border Office Archive.

Committee on Air Quality Improvement for the El Paso- Ciudad Juárez- Dona Ana County Air Quality Management Basin (Hereafter JAC).291

The JAC provided a vehicle to develop recommendations for the Air Work Group related to a broad scope of activities. These activities included monitoring and modeling air pollution, exchange of data and information, technical assistance and technology exchanges/transfers, education and public outreach initiatives, and development of innovative strategies for pollution abatement including emissions trading, international emission offset projects, and other economic incentive programs.292 In many ways, these activities mirrored those that collaborators in the region had managed for years by finding creative ways around jurisdictional constraints. The JAC now enabled these activities and carried the imprimatur of a federally-recognized binational body with the prescribed participation of governmental and non-governmental stakeholders.

According to the agreement, the JAC membership, consisting of 20 persons - ten from each country was to be appointed by the SEMARNAP and the U.S. EPA. As discussed in the previous chapter, the countries were each to name five government officials from federal, state, and local jurisdictions and five non-government members from businesses, academia, and civic and environmental organizations. All of the non-governmental members had to reside within the


292 “Appendix I Annex V To The Agreement Between The United Mexican States And The United States Of America On The Cooperation For The Protection And Improvement Of The Environment In The Border Area Agreement For Cooperation Between The United Mexican States And The United States Of America Regarding International Transport Of Urban Air Pollution,” May 7, 1996, United States Statutes at Large.
Paso del Norte Air Basin in order to insure that local residents had a substantial presence on the JAC.293

This agreement was a victory for Paso del Norte residents because it provided them with a legally recognized mechanism with which to work as a binational community in matters of transboundary air pollution. Although this was not the local control that the Task Force had proposed in the IAQMD, it was an important development because it recognized the common air basin and it codified the involvement of business, NGO, and academic representatives in a binational advisory board for the first time in border environmental policy. During the deliberations of the agreement, there was substantial uneasiness amongst Task Force members who feared that negotiators would debilitate the original proposal to the point where any semblance of local control was lost. While the final agreement did not give the JAC the authority the Task Force had hoped for, most members acknowledged it represented a significant commitment on the part of both federal governments to be more inclusive in their air quality management and to facilitate cross-border pollution mitigation collaboration.294

In anticipation of the naming of the JAC appointees, the EDF worked with the Task Force, the El Paso Community Foundation, and government partners to organize a two-day event titled “Managing Transboundary Air Quality in the Paso del Norte Region: A Symposium on the Joint Advisory Committee of Air Quality Improvement,” on June 26 and 27 in Ciudad Juárez. The symposium featured panel discussions and presentations from federal officials from the EPA, SEMARNAP, PROFEPA, and Mexico’s Secretaría de Relaciones Exteriores. State and

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293 Ibid.
local environmental and planning officials from all three states participated. There was also ample representation from NGOs such as EDF, FEMAP and Physicians for Social Responsibility, universities including UTEP, NMSU, UACJ and ITESM, and local business leaders.295

The symposium allowed the Task Force to continue educating federal and state officials regarding the economic and environmental conditions in the air basin and the air quality collaborations that were ongoing. It was also an opportunity for government officials to speak about their commitment to the JAC. Notably, Dr. Adrian Fernández, deputy director for environmental administration at INE-SEMARNAP, stated that the work of the Task Force had been a big lesson for him in multisectoral innovation and collaboration. He predicted that the JAC would become a model for the world. Pledging to support this effort, Fernández urged Task Force members not to be discouraged because the JAC was not exactly the IAQMD that they proposed and suggested that the desired outcomes were attainable through the approved framework.296

The symposium included sessions to develop a work plan, legal frameworks, and operating procedures for the JAC. The objective of these discussions was to do as much of the groundwork as they could in order for the JAC to be operational and productive once the members were named. They discussed priorities and objectives that included creating economic incentives and transboundary pollution abatement options with measurable outcomes. In many

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296 Ibid.
ways, this symposium served as an opportunity to synthesize the work of the Task Force and set the stage for the JAC.\textsuperscript{297}

During the symposium, Bob Hannesschlager, EPA Assistant Regional Administrator, reported that they had already received over 30 nominations and anticipated naming the U.S. appointees to the JAC in July. Unfortunately, the U.S. and Mexico did not name the appointees to the JAC for five months. Frustrated with this delay, the Task Force Chairman Danny Vickers wrote a letter to the EPA Regional Administrator Jane Saginaw on October 1, acknowledging her support of the JAC and urging her intervention to move along the appointment process. On the Mexican side, Task Force leadership collectively wrote to SEMARNAP Secretary Julia Carabias with a more subtle message, in line with the more diplomatic approach customary to addressing Mexican government officials. In this letter the Task Force invited Carabias to host the signing of the U.S. Mexico border environmental plan called Frontera XXI/Border XXI in Ciudad Juárez at the end of October in conjunction with a scheduled visit from Chihuahua Governor Francisco Barrio. They offered their full support to make the signing ceremony possible and mentioned the opportunity to proclaim the progress made toward the creation of the JAC during these proceedings. Judging from their responses, Carabias and Saginaw responded favorably to the Task Force’s petitions for action. On October 28, both officials presided over the signing ceremony for the Frontera XXI/Border XXI in Ciudad Juárez followed by a ceremony on October 29 to name the Mexican and U.S. appointees to the JAC.\textsuperscript{298}

\textsuperscript{297} Ibid.

The following month the JAC convened in El Paso for its first meeting. Jane Saginaw and Dr. Victor Hugo Páramo, representing the U.S. EPA and SEMARNAP, respectively, introduced the U.S. and Mexican appointees. The table below lists the inaugural JAC appointees for both countries along with their affiliation. Once again, there is a significant question related to the ASARCO representative named to the JAC. As stated earlier, Martin did not have a record of engagement in air quality projects in the region, leaving it unclear why the U.S. EPA appointed him to the JAC when there were other highly engaged private sector representatives.

Table 7. U.S. and Mexico JAC Appointees

<table>
<thead>
<tr>
<th>JAC U.S. Appointees</th>
<th>JAC Mexico Appointees</th>
</tr>
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<tbody>
<tr>
<td>Jane Saginaw – Regional Administrator, EPA</td>
<td>Dr. Victor Hugo Páramo – INE-SEMARNAP</td>
</tr>
<tr>
<td>George Avalos – Director of Transportation, Doña Ana County, NM</td>
<td>Maria del Pilar Lopez Marco – PROFEPA</td>
</tr>
<tr>
<td>Dr. Elaine Mowinski Barrón – El Paso Physician, Texas Water Development Board Member, former Chairman of the PDNAQTF</td>
<td>Dr. Rosalba Rojas Martinez – Director, Center for Environmental Health Programs – Secretaría de Salud</td>
</tr>
<tr>
<td>Archie Clouse – Air Program Director, TNRCC Region 6</td>
<td>Jose Trevino Fernández – Director, Environmental Department – State of Chihuahua</td>
</tr>
<tr>
<td>John Cordova, Engineer, City of El Paso</td>
<td>Oscar Ibañez Hernández – Director, Department of Urban Development and Ecology – Municipio de Ciudad Juárez</td>
</tr>
<tr>
<td>Dr. Carlos Rincón, Border Air Program Director, EDF</td>
<td>Rene Franco – representing environmental organizations in Ciudad Juárez</td>
</tr>
<tr>
<td>Tom Martin – Environmental Manager, ASARCO – El Paso</td>
<td>Angel Peralta Miram – Representing the business community</td>
</tr>
<tr>
<td>Dr. Charles Groat – Director, Center for Environmental Resource Management, UTEP</td>
<td>Dr. Hector A. Quevedo – Universidad Autonoma de Ciudad Juárez</td>
</tr>
<tr>
<td>Danny Vickers – President, EDM International and Chairman of PDNAQTF</td>
<td>Dr. Enrique Suarez – Executive Director, FEMAP</td>
</tr>
<tr>
<td>Cecilia Williams – Chief of the Air Quality Bureau, New Mexico Environmental Department</td>
<td>Felipe Adrian Vasquez – Chihuahua Consultative Committee for Sustainable Development</td>
</tr>
</tbody>
</table>

Each appointee had an opportunity to say a few words about their area of expertise or their specific interest in the work of the JAC. Of note, Oscar Ibañez Hernández, director of the Department of Urban Development and Ecology for the Municipio de Ciudad Juárez expressed what an enormous cultural, administrative and political advancement this was for the coexistence of their cross-border community. He predicted that the JAC would become a model for other aspects of binational relations. Dr. Elaine Mowinski Barrón expressed the magnitude of the task at hand in terms of the health implications for the residents of the region, warning “what we pollute the air with will come back to us in diseases, increased healthcare costs and in less cognitively sound people.”299

Many of the JAC appointees acknowledged the work of the Task Force for advancing cross-border collaboration in air quality improvement. They discussed several ongoing projects and recommendations for the JAC. These included 1) creating a joint air quality public information system for the region, 2) supporting the Paso del Norte Border 2000 Task Force to reduced wait times at the ports of entry, 3) establishing a joint emissions inventory, 4) developing an international emissions credits trading program, 5) creating a regulatory and enforcement mechanism to reduce brick kiln emissions, and 6) establishing obligatory vehicle inspections in Ciudad Juárez. JAC members volunteered to work on action items associated with each of these projects.300

In addition to the project discussions, the meeting concluded with comments from the public – many of whom were Task Force members. Beatriz Vera, an active Task Force member

299 Joint Advisory Committee for the Improvement of Air Quality in the Ciudad Juárez, Chihuahua/El Paso, Texas/Doña Ana County, New Mexico Air Quality Management Basin, Meeting Minutes, El Paso Texas, November 12, 1996. All JAC meeting minutes are found at https://www.cccjac.org/archived-meetings.html (accessed 10/18/2021)
300 Ibid.
and Dr. Octavio Chávez, the new Task Force chair, emphasized how important it was for the JAC to make every effort to raise awareness of this new body and to publicize upcoming meetings. Vera also requested that the JAC incorporate public comment into the proceedings as they discussed the projects to ensure the JAC considered the community input. The minutes of this inaugural meeting reflect a vocal commitment from the local JAC appointees and Task Force members to continue to work toward the improvement of the region’s air quality and to utilize this new advisory committee to push forward innovative cross-border mitigation strategies that required new legal frameworks from both federal governments.301

The JAC began to meet quarterly the following year. During their first meeting in 1997, a clear tension emerged between the non-governmental and governmental JAC members as non-governmental members pushed for JAC involvement beyond just making recommendations to the Air Working Group. The JAC worked through this, concluding that the bylaws for the group should allow for recommendations to the Air Working Group as well as responsiveness to other relevant initiatives that required more immediate action. The JAC co-chairs established a subcommittee to develop the bylaws to formalize the operations of the advisory committee.302

In addition to working through the technical aspects of the JACs role, they also took up the discussion of the international emissions reduction credits program (IERC program). Dr. Ron Ketter with UTEP’s Public Administration program presented a proposal for an IERC program that would allow companies in the region to “offset” their emissions by investing in projects

301 Ibid
302 Joint Advisory Committee for the Improvement of Air Quality in the Ciudad Juárez, Chihuahua/El Paso, Texas/Doña Ana County, New Mexico Air Quality Management Basin, Meeting Minutes, Ciudad Juárez, Chihuahua, February 18, 1997. JAC Bylaws were finalized and approved during the August meeting according to Joint Advisory Committee for the Improvement of Air Quality in the Ciudad Juárez, Chihuahua/El Paso, Texas/Doña Ana County, New Mexico Air Quality Management Basin, Meeting Minutes, El Paso Texas, August 12, 1997.
anywhere in the air basin that would result in a net emissions reduction. This mechanism, Ketter argued, would allow greater cost efficiencies that result in greater emissions reductions. For example, paving some number of miles of unpaved roads in Ciudad Juárez would be cheaper and create a greater reduction in particulate matter than installing more complex air filters at a manufacturing facility. The IERC program would also give companies more opportunities to reduce emissions offsite in order to enable expansion and economic growth in the region. Ketter suggested identifying a company-sponsored pilot project whereby scientifically verified emissions reductions could be credited to the sponsoring company for emissions reduction credits.\(^{303}\)

The JAC members agreed that such a project would be advantageous to the residents as well as the companies in the region. Emissions reduction credits trading programs were permissible by environmental policy in both the U.S. and Mexico. The problem was that nothing within those legal frameworks allowed for this type of program to operate across international boundaries. The group agreed to identify specific legal hurdles and begin working on ways to clear them.\(^{304}\) This discussion served as a critical launching point for an unprecedented cross-border emissions reduction project that is the subject of the next chapter.

Over the course of the next four years, the JAC advanced several projects with high potential for air quality improvement in the region. One such initiative, which came to fruition after almost three years of advocating and leveraging the influence of the JAC Mexican federal appointees, compelled PEMEX (Petroleos Mexicanos) to supply oxygenated gasoline in Ciudad Juárez during winter months. The JAC expected this measure, which would mirror the

\(^{303}\) Ibid.

\(^{304}\) Ibid.
oxygenated fuel requirement in El Paso, to result in a reduction of CO emissions of up to 16% in Ciudad Juárez. According to Jesus Reynoso with the El Paso City County Health and Environmental District (EPCCHED), CO exceedances dropped from 15-16 per year in 1992 when the oxygenated fuel requirement was initiated in El Paso, to zero in 1998 and 1999. For the initial phase of the roll out of oxygenated fuel in Ciudad Juárez, the EPCCHED assisted their Mexican counterparts by testing the fuel samples collected at gasoline stations throughout the city to ensure compliance from PEMEX. The project moved forward slowly and with the constant pressure from local JAC members who refused to accept the stalling and false justifications from PEMEX and other federal officials who resisted change. This was an example of how the JAC members, from all sectors and levels of government, took a local recommendation and saw it through to execution for the benefit of the air basin and its residents.\(^{305}\)

CONCLUSION

In response to a strong multi-sectoral, *frontera*-based advocacy effort championed by the Paso del Norte Air Quality Task Force over many years, the U.S. and Mexico established the JAC as a vehicle to develop recommendations related to a broad scope of activities to improve air quality in the Paso del Norte air basin. The JAC was a significant victory for Paso del Norte residents because it provided them with a legally recognized mechanism within which to work as a binational community in matters of transboundary air pollution. This epistemic community, \(^{305}\) Joint Advisory Committee for the Improvement of Air Quality in the Ciudad Juárez, Chihuahua/El Paso, Texas/Doña Ana County, New Mexico Air Quality Management Basin, *Meeting Minutes*, El Paso City County Health and Environmental District – WIC Training Center, December 2, 1999.
anchored by its *fronterizo* identity, insisted on accountable governance and solutions to the air quality crisis developed by residents of the region who breathed the air every day.

Beyond the Paso del Norte air basin, there was a larger acknowledgement of the value of the multisectoral engagement and the synergies created by that epistemic community. This model of *frontera*-based advocacy and involvement became the new standard and blueprint for border environmental governance. By 2003, the US and Mexico adopted the Border 2012 program- a plan that incorporated a *frontera*-based approach that focused on the environmental needs of border residents. The Border 2012 program featured multi-stakeholder task forces for water, air, solid waste and other areas of environmental management that resembled the JAC. The Border 2020 program contained this same task force structure, as does the current Border 2025 program. These task forces and working groups representing sister communities along the border have informed the binational environmental project priorities adopted by the U.S. EPA and SEMARNAP for almost two decades.  

During the inaugural meeting in 1996, Oscar Ibañez Hernández was prescient when he stated that the JAC would become a model for many aspects of binational relations. The Paso del Norte Air Quality Task Force and the JAC were transformational in their *fronterizo* approach to shared resource management and served as a template for the binational multi-stakeholder structures that characterize border environmental policy making today.  

That said, it is also important to acknowledge that while the JAC represented a significant transformation in community involvement in border environmental governance, decisions regarding the levels of investment in environmental infrastructure and regulatory enforcement continue to be made thousands of miles away from the border. Border communities live with an

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inordinate and unjust burden of trade-related pollution without the adequate public infrastructure to manage the demands of a globalized economy. Having a seat at the table to help develop border environmental policy is certainly an important step forward, but sustained and targeted *frontera*-advocacy efforts and the federal expenditures in critical infrastructure that truly address the environmental and human health needs of *fronterizos* are essential.
Chapter Five: Ciudad Juárez Brick Kilns: A Case Study in Innovative Cross-Border Collaborations, Failed Good Intentions, and Appropriate Technologies

In the early 1990s, the U.S. EPA characterized the Paso del Norte region as having the worst air quality along the U.S.-Mexico border. According to their indices, the air was unhealthy for the general population 68 days a year and unhealthy for sensitive groups 128 days a year. In Ciudad Juárez, the major sources of pollution were motor vehicles, unpaved roads, and open burning. All of these emissions sources grew along with this sprawling city as industrialization took hold during the 1970s and 1980s. One informal sector that expanded in order to keep up with demand for new housing construction was the brickmaking business. Ladrilleros, as brick makers are called in Spanish, provided their community a valuable commodity, but their production methods involved open burning of highly polluting fuels that produced tons of toxic emissions. This chapter explores the innovative fronterizo-led binational efforts to work with the ladrilleros to develop more efficient production technologies, reduce emissions, and improve their well-being. It examines the way in which the ladrilleros themselves helped reframe the challenges in order to create appropriate technologies that could be adopted in their communities and replicated in microenterprises worldwide. Finally, it illustrates the opportunity for significant and cost-effective pollution reduction through cross-border emissions reductions credits.307

In the late 1960s and early 1970s, the *ladrilleros* in Ciudad Juárez utilized centuries-old technology to build their microenterprises in several *colonias* along the outskirts of the city. These microenterprises mushroomed as demand for housing expanded after the implementation of the Border Industrialization Program and development of the maquiladora industry. As the city footprint expanded, many *colonias ladrilleras* found themselves in the middle of residential neighborhoods. Due to the heavy dark smoke the brick kilns produced and their proximity to these residential neighborhoods, they found themselves the subject of many complaints to municipal authorities. Nevertheless, the brick kiln expansion was constant throughout the 1980s, with *ladrilleros* siting new kilns in close proximity to residential and industrial developments where demand for bricks was high. Between 1990 and 1995 brick kiln operations ballooned from 350 to a peak of 450 in response to a booming international trade economy, but a devastating peso devaluation in late 1994 crippled the economy and brought the brick kiln count down to 290 by the end of 1995.\(^{308}\)

The *ladrilleros* operated traditional brick kilns that were large square-shaped open chimney clay structures that produced an average of 8000 bricks per burn. Each burn lasted between 20-30 hours. They fueled their kilns with materials such as scrap wood, saw dust, and shipping pallets. Some also used paper products, particle board, railroad ties, tires, used motor oil, and other petroleum products to reach temperatures necessary for brick-fabrication of over 600 degrees Celsius. For *ladrilleros* with very limited means, the imperative was to find the cheapest and most readily available fuels in order to be competitive in an industry with minimal

profit margins. Unfortunately, the fuel mix they used emitted carbon monoxide, particulate matter, volatile organic compounds, nitrogen oxide, sulfur dioxide, carbon dioxide and heavy metals into the air.footnote{309}

Most ladrilleros were unaware of the emissions-related health risks for themselves or their families, who often lived in modest houses built adjacent to or in close proximity to their kilns. When they fired the brick kilns for their normal bi-monthly production, the emissions created horrible dark black plumes of smoke that could be seen billowing into the sky from miles away. Although these emissions were visible throughout the air basin, the contaminants tended to settle close to the sources, thereby creating especially unhealthy conditions for brick kiln operators, employees and their families. Numerous studies published between 1995 and 2006 have documented the human health effects of exposure to particulate matter and other air contaminants that are contained in brick kilns emissions. One study focused on health effects of air pollution on children in Ciudad Juárez found that elevated levels of particulate matter increased the risk of respiratory mortality among infants. Another publication found that brick kiln emissions were responsible for causing serious health problems as well as more than a dozen premature mortalities per year.footnote{310}

footnote{309} Ibid.

In 1989, the *Consejo Municipal de Ecología* began promoting propane gas as a fuel for brick making in order to reduce emissions. The following year, the *Federación Mexicana de Asociaciones Privadas* (FEMAP) took the lead on an initiative to help *ladrilleros* in Ciudad Juárez convert to cleaner burning technologies. At the federal level, political leaders in the U.S. and Mexico began focusing additional attention and resources on border environmental issues as NAFTA debates intensified. In 1991, President Carlos Salinas de Gortari’s administration created a fund called *Empresas Solidaridad* to assist microenterprises. From this initiative, FEMAP was awarded a trust fund of 800,000 pesos to assist brick makers with the transition to cleaner burning propane fuel. FEMAP used this 800,000 pesos to leverage an 8,000,000 peso line of credit with NAFIN, the Mexican federal development bank dedicated to financing small business project.311

FEMAP’s president and founder, Guadalupe de la Vega, utilized her influence and network to secure the scientific and engineering expertise of Los Alamos National Laboratories (LANL) and El Paso Natural Gas Company (EPNG). These scientists and engineers from all over the country interviewed and observed the *ladrilleros* and their kilns to gain a better understanding of their operations and the modifications that would be needed to incorporate the propane-powered burners. Following months of field and laboratory-based research, LANL and EPNG engineers developed modifications to incorporate propane burners into the brick kilns. They were confident the propane equipment would provide greater fuel efficiency and more uniform burning, in addition to emissions reduction benefits. FEMAP took these design recommendations to the propane providers and the *ladrilleros* unions and requested their

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assistance in educating the ladrilleros about the economic and health benefits of the conversion. The propane providers donated much of the equipment for the kilns and set up lines of credit for the ladrilleros to purchase the fuel. Additionally, ladrilleros had access to financing for any required modifications through the federal Empresas Solidaridad fund secured by FEMAP.\textsuperscript{312}

At the same time that ladrilleros learned about these propane modifications, state and municipal emissions regulations and enforcement were ramping up. In 1991, the Ley Ecológica Para el Estado de Chihuahua restricted the combustible fuels for brick kilns to clean sawdust and wood. Municipal authorities, under the leadership of newly-elected Municipal President Francisco Villarreal, banned all “dirty fuels” and allowed only propane to be used for kiln fuel. They also encouraged citizens to report violations of this new fuel ordinance. Ladrilleros who violated the “dirty fuel” ban were arrested and jailed for 24-36 hours and sometimes fined. In addition to the enforcement approach to address the brick kiln emissions, FEMAP, the Municipio de Ciudad Juárez, and the ladrilleros unions worked with the principal housing construction entities in the city to set a uniform minimum brick price in order to protect the law-abiding ladrilleros from being undercut by those who continued to use cheaper clandestine fuels. The combination of the carrot – the free propane equipment, fixed brick pricing, and the line of credit to facilitate conversion – and the enforcement stick motivated many ladrilleros to convert to propane during 1992 and 1993. An estimated 50-60 percent of the kiln owners had converted to propane by fall 1993.\textsuperscript{313}


\textsuperscript{313} Blackman and Bannister, “Pollution Control in the Informal Sector,” 846, 848.
Unfortunately, in the early 1990s Petroleos Mexicanos (PEMEX) began to eliminate propane subsidies as a part of the Salinas Administration’s economic liberalization initiatives. The new economic policy was completely misaligned with the administration’s environmental initiatives. This proved disastrous for the ladrilleros, who saw their fuel costs skyrocket.

According to one study, the propane fuel costs per brick went from being 29% higher than scrap wood in 1992 to being 162% higher in 1995. Faced with this untenable economic situation, most ladrilleros abandoned their propane equipment. The municipal authorities soon rescinded their propane fuel mandate and allowed ladrilleros to burn sawdust and scrap wood that was free of resins and varnishes. By 1995, the rising gas prices and the massive peso devaluation drove all but one ladrillo to abandon the propane technology.314

Despite this setback, LANL scientists continued their research in an effort to improve their brick kiln designs. In 1995, the U.S. EPA awarded the El Paso Community Foundation a $32,000 grant to build 14 new brick kilns that incorporated recommendations for a cylindrical base and utilized equipment donated by EPNG and LANL. The kilns were built in Ciudad Juárez at the site of FEMAP’s newly established Instituto de Ecotecnologia (ECOTEC), an educational facility dedicated to training and educating ladrilleros in the technical aspects of brickmaking. While the new kilns displayed improved structural integrity at the extremely high temperatures required to fire the bricks, emissions were not substantially reduced and the fundamental problem of fuel costs continued to plague researchers.315

REFRAMING THE PROBLEM AND THE SOLUTION

LANL partnered with New Mexico State University (NMSU) doctoral student Robert O. Marquez to continue to refine their brick kiln research and modifications. A *fronterizo* with a uniquely empathetic perspective, Marquez approached this problem in a very different way. Born in Deming, New Mexico, into a large and impoverished Apache family, Marquez had survived extreme hardships in his early life and felt that he had a responsibility to use his talents to help other people. In his dissertation, titled “Appropriate Chemistry for the Economically Limited People of the Earth,” Marquez described brick makers of the world as fiercely independent people who withstood harsh and dangerous conditions to provide their societies a valuable commodity. Marquez referred to the brick makers as people of the earth because they were dependent on sunlight, water, clays and sand for their livelihood.\(^{316}\)

In the Paso del Norte region, sand was abundant in the desert and clays could be obtained along the Rio Grande valley. Depending on the location of the brick kilns, water was either brought in by truck or piped in. The most limited and most expensive resource for the *ladrilleros* was fuel to fire the kilns. As discussed earlier, when alternative fuels such as propane became too expensive, the *ladrilleros* resumed using the highly polluting fuels that brought them so much scrutiny years earlier. For Marquez, this meant that the technological solution that the

\(^{316}\) Marquez, “Appropriate Chemistry for the Economically Limited People of the Earth,” 6.
engineers and scientist had created for these communities was not developed with a complete understanding of the problem, thereby making it an inappropriate technology. He proposed that “the problem is not the brick-makers, their processes, their environment, or their way of life but it is society’s philosophical approach to understanding the problem, society’s view of science, and technology’s role in solving the perceived problem.” He suggested reframing all of the established assumptions about brick making, including judgements about the use of discarded materials for fuel.317

Marquez suggested that economically limited people (EPL) who lived in these communities and did this work every day needed to be equal partners on the research team attempting to solve the problem for the ladrillero community. He also argued that the best technological solution was not necessarily the best overall solution because technology needed to be balanced with economic, political, and communal factors. In order to find an appropriate solution to the problem, ladrilleros needed to be an active part of the experimental process so that they could feel ownership of the outcome. Consistent with this belief, Marquez worked with ladrillo Don Enrique Chávez to develop a new kiln design that could reduce emissions, burn times, and fuel without altering any of the required inputs or placing any limitations on the type of fuels that could be used.318

With the assistance of his research team that included the ladrilleros and colleagues from the Universidad Autonoma de Ciudad Juárez, Marquez designed a dual cylinder kiln that featured a domed roof referred to in brick kiln literature as the MK2 design. Following several modifications developed through extensive experimentation, the MK2 design incorporated a raw

clay brick filtration system that utilized the electrical charge of the clay to trap and filter the
smoke and soot produced during the firing of bricks. The domed roof and heat recapture system
created better combustion efficiency and decreased fuel costs by 50 percent while also reducing
the emissions produced in each burn by up to 80 percent. The kilns included simple features that
allowed the kiln operator to check the temperature of the bricks without having to make the dangerous
climb to the roof, as was required with traditional kilns. The building materials and construction techniques were those
traditionally used by the ladrilleros, thereby facilitating the subsequent adoption and
construction of the kilns. In addressing this problem, this research team applied “appropriate
chemistry” to develop a technological solution alongside, not in spite of, the ladrillero
community.319

The challenges related to brick kiln emissions had been a part of the Paso del Norte Air
Quality Task Force discussions since its first meetings in 1993. With FEMAP and other partners
active in the Task Force also participating in the JAC, these discussions and initiatives also
transitioned to the JAC’s agenda. During the JAC’s first meeting, Dr. Enrique Suárez, FEMAP’s

319 Texas Commission on Environmental Quality, “A Study of Brick-Making Processes along the Texas Portion of
Chemistry for the Economically Limited People of the Earth,” 129-130.

166
executive director, urged the group to continue to support efforts to improve brick kiln production in Ciudad Juárez. The group also discussed the need to establish the legal frameworks for international emissions reduction credits (IERC) for the region. Subsequent work groups and discussions around both of these topics provided the catalyst for a unique cross-border collaboration, despite the fact that these discussions were tense at times and by no means indicated a binational consensus around how to address the brick kiln emissions challenges.

This dynamic was certainly palpable at the February 1998 JAC meeting. Marquez was slated to present his team’s findings on the environmental brick kilns. Prior to the start of the meeting, PROFEPA’s Maria del Pilar López Marco expressed an objection to the agenda item because of sensitivities to the U.S. involvement in Mexico’s brick kiln problems. Responding to this objection from a federal counterpart, U.S. EPA’s Matt Witosky suggested to the JAC’s executive secretary, Victor Valenzuela, that they table the item. Valenzuela, an El Paso native and TNRCC El Paso region planner, disagreed and insisted that the presentation was scientific in nature and would not be controversial. During his presentation, Marquez shared his vision for the application of appropriate technologies to this global brick kiln problem and indicated that the domed design and the clay filtration system they had developed had already demonstrated significant emissions reductions. He asked the JAC for their support of the project and requested their assistance in attaining the required permissions from Mexican immigration authorities to continue this work in Ciudad Juárez.

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320 Joint Advisory Committee for the Improvement of Air Quality in the Ciudad Juárez, Chihuahua/El Paso, Texas/Doña Ana County, New Mexico Air Quality Management Basin, Meeting Minutes, El Paso Texas, November 12, 1996,

López Marco suggested that Marquez continue to do his research in the U.S. then bring the technology to Mexico once it was ready for implementation. She also shared that PROFEPA was already preparing a plan for regulating the fuels that brick kiln operators were allowed to burn, suggesting that this issue could be resolved through regulatory enforcement. Her comments were met by resistance from another fronterizo, Oscar Ibanez with the Municipio de Ciudad Juárez. He insisted that this collaborative research effort provided Juárez academic institutions an opportunity to build their technical and engineering capacity. He insisted that this was one of the few initiatives in which Mexicans were an integral part of the technical work, thereby enabling them to achieve their “goals in and for Mexico.” Attempting to mediate this tension between Mexican federal and local officials, INE’s Dr. Victor Hugo Páramo, the Mexican JAC Co-chair, suggested that in order to move forward with a recommendation they would need more data on the specifics of the kiln design. Marquez took the opportunity to add that the prototype they developed reduced emissions by up to 80 percent and the total amount of fuel required by 50 percent, regardless of what fuel source was utilized. This was critical to the health and economic well-being of the ladrilleros because the new design did not require expensive adaptations to realize these benefits. Marquez ended his slide presentation with pictures of the ladrilleros at work knee deep in mud and their children playing amidst the ashes from the kilns. He reminded the JAC that these individuals were the driving motivator for his work. Following this final appeal for support, López Marco relented in her opposition and suggested that the JAC present a resolution of support to the Air Working Group. The JAC agreed to do so.322

During that same February meeting, El Paso Electric’s Mark Rodriguez spoke about the company’s interest in working with authorities on both sides of the border to improve air quality.

322 Ibid.
He encouraged the JAC to help create policies and incentives that would attract business to participate in such an effort. While Rodriguez did not provide an example of the incentives he had in mind, IERCs were one of the tools the JAC discussed that day. UTEP’s Ron Ketter explained that IERCs would allow a company to invest in an emissions reduction project somewhere in the air basin in order to offset its existing emissions or to justify an expansion. Given that El Paso County was in non-attainment status, any expansion that created additional emissions required an emissions offset in order to gain permit approval. As such, IERCs could be a critical economic development tool as well as an emissions reduction tool.\textsuperscript{323}

A principal advantage of the IERCs for highly regulated companies like EPE that already had technologically advanced pollution reduction equipment is that they could achieve significant emissions reductions by investing in basic abatement projects. For example, investing $500,000 in road paving or gasoline fume recapture equipment could produce significantly higher emissions reductions than the same amount of money spent on next-tier filtration technologies available for their existing equipment. Ketter emphasized that the key to making IERCs operational was to quantify and verify the emissions reduction achieved through the project – and of course to have the legal framework that would enable recognition of emissions reductions across international boundaries. While the IERCs were fairly straightforward conceptually, quantifying the emissions reduction of a project in order to verify actual offsets could be cumbersome and time consuming. The IERCs also required cross-border collaboration between air quality authorities with significantly different resources to dedicate to such a project.\textsuperscript{324}

\textsuperscript{323} Ibid.
\textsuperscript{324} Ibid. Luis Ito, EPE environmental, health and safety director, interview by author, El Paso, Texas, September 22, 2021.
After that JAC meeting, EPE’s Environmental Department staff met with Marquez and his advisor Dr. Antonio Lara to explore ways in which they could work together. Marquez and Lara wanted to share their findings about the properties of clay, which they felt held promise for different kinds of filtration applications. The opportunity to work together came into clearer focus in 1999, when the Texas Legislature was developing a plan to deregulate the electric utility industry in most of Texas. As a part of the legislative negotiations, senate bill 7 (SB7) included a provision aimed at controlling nitrogen oxide (NOx) emissions in non-attainment areas of the state. Although it was intended primarily for the coal and lignite-fired power plants in east Texas, this provision created a new cap-and-trade program on NOx emissions for all power plants in Texas. The cap-and-trade program created a ceiling for the permissible NOx emissions of each power provider in the state and allowed for emissions offsets and credit trading in order to meet the new cap requirements. EPE worked with El Paso’s state senator Eliot Shapleigh and the rest of the El Paso legislative delegation to have language embedded in this mammoth deregulation bill that would allow electric utility companies along the Texas-Mexico border to pursue emissions offsets or credits in Mexico – a fronterizo legislative initiative that enabled innovative solutions.325

The new SB7 requirements compelled EPE to achieve a 50% reduction in NOx emissions from three boilers at the Newman power plant in northeast El Paso County. Those boilers already had water-injection pollution reduction equipment, therefore the prospects for achieving the required emissions reductions from additional equipment were low and it would be very

expensive. EPE was happy to have the option of investing in pollution reduction projects in Mexico to meet the new NOx cap, and to be allowed to continue normal operations at the Newman power plant. With the enabling legislation in place in Texas, EPE Environmental, Health and Safety Director Luis Ito began working with the TNRCC to obtain approval for an IERC project. Ito proposed replacing a number of traditional brick kilns in Ciudad Juárez with Marquez’s environmental brick kilns and applying the emissions reductions to EPE’s required NOx reductions. An El Paso native with family in Ciudad Juárez, Ito welcomed the opportunity to spearhead a project for his company that could have a positive impact on the binational community he called home.326

The TNRCC was open to this IERC proposal but they identified two critical issues that EPE needed to address. The first was related to quantification of the brick kiln-related emissions offsets. In order to know how many emissions reductions credits could be awarded to EPE, TNRCC needed scientific verification of the emissions produced by traditional brick kilns and the MK2 brick kilns. The second issue was related to the actual contaminants offset by the conversion to the MK2 kilns. While the MK2 kilns had demonstrated significant reductions in emissions, those emissions were primary comprised of carbon monoxide and particulate matter. TNRCC did not have the authority to allow EPE to substitute the reduction of one type of contaminant for another.327

In order to address the first issue, EPE retained an engineering consulting company named URS Corporation to produce the data that TNRCC needed in order to approve the brick kiln IERC proposal. With the approval of the New Mexico Environment Department, EPE

worked with URS and the NMSU research team to build a traditional brick kiln and an MK2 brick kiln on the grounds of EPE’s Rio Grande power plant in Sunland Park, New Mexico.

Utilizing U.S. EPA methodology for sampling and measuring, URS monitored and quantified the emissions produced in burns from both kilns. This construction, testing and measuring process took two years to complete. URS concluded that the MK2 kiln reduced emissions by an average of 466lbs of contaminants per burn, with the vast majority of the emissions reductions in carbon monoxide, followed by particulate matter, NOx and VOCs.328

To address the second issue, EPE went back to the El Paso legislative delegation during the 2001 legislative session for their support of legislation that would amend the Texas Health and Safety Code to allow the TNRCC to accept emissions substitutions for the purposes of emissions control. Senator Eliot Shapleigh agreed to author senate bill 1561, a narrowly tailored bill that fine-tuned the enabling language in SB7 from the previous legislative session. This bill allowed the TNRCC to authorize emissions reductions outside of the U.S. to satisfy the emissions reduction requirements for a holder of a Texas air emissions permit along the international border, so long as the reductions were in excess of what was required in the state implementation plan and that said reductions were quantifiable and enforceable. It allowed the TNRCC to use the emissions reductions of one contaminant to satisfy the emissions reductions requirements of another contaminant so long as the reductions were comparable in quantity and resulted in greater health benefits than could be achieved by reductions at the permit holder’s facility. Finally, it required that substitutions only be allowed if the contaminants being substituted were those for which an area had been designated in non-attainment. Given its

narrow focus on the border region and the requirements for contaminant verification, the legislation did not draw any significant opposition in public hearings and was ultimately passed by the Texas Legislature.\textsuperscript{329}

With the enabling legislation approved and the URS report completed, EPE submitted a proposal to TCEQ requesting approval to satisfy the reduction obligation of 17 tons of NOx through the conversion of five brick kilns in Ciudad Juárez. In addition to the conversion of the five brick kilns required for the emissions offset, EPE committed to building up to 60 MK2 kilns in Ciudad Juárez. While they awaited approval from TCEQ, Ito and other EPE representatives met with Mexican officials at the local, state and federal level to ensure they received the necessary approvals in Mexico as well. They were surprised to learn that because the brick kiln industry was largely informal, there was no licensing or permitting process required for the conversion of the kilns. Essentially, the brick kiln conversion was a business-to-business arrangement between EPE and the individual brick kiln owners.\textsuperscript{330}

EPE received approval from the TCEQ for the IERC on November 16, 2002. And although there was no required authorization for the conversion project in Mexico, EPE’s Ito worked closely with the Alma Leticia Figueroa, the director of the Dirección General de Ecología y Protección Civil del Municipio del Ciudad Juárez (Dirección de Ecología Municipal). Figueroa served as the official witness of the five kiln conversions for verification with the TCEQ. She also committed the Dirección de Ecología Municipal to conduct quarterly inspections of the new MK2 kilns to ensure they were operating as expected. The Dirección de Ecología Municipal...
Ecología Municipal in turn requested EPE’s cooperation in building any additional MK2 kilns at a new colonia ladrillera named Mexico 68, a site which the Dirección de Ecología Municipal was developing in order to relocate and consolidate many of the brick kiln operators that were scattered throughout the city. While they had initially planned to build MK2 kilns at various colonias ladrilleras to serve as demonstration projects that could encourage more ladrilleros to convert their kilns, EPE agreed to assist the Dirección de Ecología Municipal by directing their contractor to build the majority of the new MK2 kilns at Mexico 68.331

In partnership with Marquez, EPE quickly identified five ladrilleros who were interested in converting their traditional ovens to the MK2 model for the purposes of the IERC. These ladrilleros entered into legal agreements with EPE whereby they allowed EPE’s contractor to destroy their traditional brick kilns and replace them with MK2 kilns. The agreement specified that the ladrilleros would assume ownership of the new kiln without conditions, other than those applicable by law. In addition to these five conversions that needed specific documentation, EPE funded the conversion of 15 additional kilns. The ladrilleros were also invited to be a part of the MK2 kiln construction team so that they could learn how to build the new kilns and share that newly acquired technical expertise with others in the future. This created technical capacity within the ladrillero community, but it also served the practical purpose of providing the ladrilleros themselves with income while their kilns were undergoing the conversion.332


The twenty brick kiln conversions were completed in the colonias ladrilleras of Fronteriza Baja and Mexico 68 between January and April of 2003. EPE submitted the required documentation for five of the conversions to TCEQ in order to receive a total of 17 tons of emissions credits – 3.3 tons of emissions reductions for each converted brick kiln. TCEQ approved EPEs credits and applied them toward the Newman Power Plant compliance account on August 26, 2003. Figure 10 is representative of the construction and demolition documentation that EPE submitted to TCEQ for

la Construcción de Un Horno Ladrillero, (undated legal agreement between EPE’s project administrator in Ciudad Juárez and the brick kiln owners located in the El Paso Electric Corporate Archives.) Note: Marquez never trademarked his MK2 design in order to ensure that it was accessible to anyone who was interested in the building a new kiln. He hoped that by making the design available and training ladrilleros to build them, this appropriate technology would become widespread.
verification and emissions credit allowances. It includes the name of the brick kiln owner, the coordinates of the brick kiln and the verification from the Dirección de Ecología Municipal. It also illustrates the stark contrast in the design of the traditional brick kiln and the MK2 kiln even while the construction materials are similar.\[^{333}\]

Although the EPE IERC was successfully completed and verified, EPE’s support of brick kiln replacements was not without complications. For the additional 15 brick kilns, EPE volunteered to provide funding to a contractor who was working with the Dirección de Ecología Municipal to develop a new colonia ladrillera. Months after the new kiln construction was completed, significant quality issues emerged. These issues came to light after a heavy storm caused flooding due to poor drainage at the site. The flooding exposed shoddy construction practices inconsistent with the MK2 design specifications, including the use of barbed wire instead of rebar to fortify the structure and the lack of a steel ring footing for the chambers. These construction flaws rendered the 15 kilns inoperable. This development exposed a lack of close supervision and inspections from either Dirección de Ecología Municipal or EPE in the voluntary phase of the project. The partners worked to correct this deficiency and over the next two years EPE supported the construction of additional brick kilns, for a total of 31 MK2 kilns in Ciudad Juárez. Fortunately, the initial five MK2 kilns that were part of the IERC were closely managed and supervised by the EPE/Marquez team and did not suffer damage from the storm. Subsequent inspections verified proper construction and operations of those MK2 kilns for years following the initial certification.\[^{334}\]

\[^{333}\] El Paso Electric, Kiln Conversion Verification Form, Submitted to Texas Commission on Environmental Quality, May 1, 2003, El Paso Electric Archives.

The EPE IERC was lauded as a ground-breaking cross-border initiative shortly after completion. EPE received the Texas Environmental Excellence Award in Innovation Technology from TCEQ as well as the Environmental Awareness Business Award from the Texas League of Women Voters in 2003. EPE used this positive attention to urge the U.S. EPA to include the Brick Kiln Project as a part of the Border Air Quality Strategy (BAQS), an initiative of the Border 2012 Air Policy Forum to support pilot programs along the border that foster sustainable development. They reiterated that while success of this IERC in converting several kilns was noteworthy, there were still more than 300 highly polluting kilns that needed to be addressed to make a significant impact on the air quality of the region. The JAC also submitted a resolution to the Air Working Group requesting the inclusion of cross-border pollution trading on the BAQS, listing the EPE IERC project as a success story.\(^{335}\)

In 2009, the Good Neighbor Environmental Board of the President and the Congress and the United States (GNEB) wrote in its annual report titled “Innovative and Practical Approaches to Solving Border Environmental Problems” that EPE’s IERC project had led to the development of brick kiln-related pilot projects the Mexican states of Baja California, Querétaro, Chihuahua and Sonora. It suggested that transboundary emissions credit trading could be explored as a tool for air quality improvement in non-attainment areas along the border. It also reported the

important fact that this type of trading was not explicitly allowed under the Federal Clean Act or under state law in New Mexico, Arizona or California - verifying that cross-border emissions credit trading remained nothing more than an interesting concept more than five years after the successful demonstration project in the Paso del Norte region. 336

It is unclear why IERCs were not adopted elsewhere. What we do know from the EPE IERC is that the tool required a motivated company, a quantifiable offset project, a willingness for collaboration at multiple levels of government and a high level of engagement from *fronterizo* stakeholders to make it work. We know from the tensions between Mexican federal and local officials during the initial discussions at the JAC meeting that there are sovereignty sensibilities to overcome. Perhaps those critical components have not co-existed in other communities along the border where IERCs could have been utilized. Former TNRCC Program Specialist Victor Valenzuela confirmed that while working with the EPE IERC, he received inquiries from air quality officials in Arizona and California who were interested in applying the concept along their borders. Once Valenzuela shared the steps taken to gain approval in Texas, they indicated that they did not believe they could secure state approval. Although anecdotal, these responses point to a lack of government flexibility and commitment to engaging transboundary solutions that could result in quantifiable quality of life improvements for border communities.337

CONCLUSION

The EPE IERC project built on years of well-intentioned efforts by many fronterizos from the Paso del Norte region who attempted to address the challenges faced by the ladrilleros. These efforts, launched by the Municipio de Ciudad Juárez and subsequently led by FEMAP, focused on reducing emissions produced by the brick kilns and improving the health and economic well-being of the ladrilleros and their families. Their goal was to help ladrilleros by developing cleaner and more efficient methods to produce bricks such that they could be more profitable and create fewer emissions. This would be a benefit to ladrillero families as well as the larger community. FEMAP’s Brick Makers Project brought significant external resources and expertise to examine, research and develop possible technological solutions. They also worked with the local and state authorities to create the enforcement pressures to compel the ladrilleros to convert to cleaner fuels. Unfortunately, these approaches and technologies failed because they did not appropriately account for the economic, political and communal realities of the ladrilleros. They were not aligned with the daily realities of these microenterprise operators with very limited resources, slim profit margins, and the immediate need to feed their families.

Fortuitously, the LANL engaged NMSU doctoral student Robert Marquez in their ongoing brick kiln research efforts. Marquez helped reframe the project so that the research included the valuable input and experience of the ladrilleros. He emphasized the value of the ladrilleros’ work in recycling the community’s waste rather than focusing on punitive measures or complex technologies. He also incorporated researchers from Ciudad Juárez in an effort to build local technical capacity that would persist after the completion of this project. The result of this mindful research was a brick kiln design that reduced fuel consumption by 50 percent and emissions by 80 percent, utilizing all of the inputs that ladrilleros had traditionally employed in
their operations. By applying “appropriate chemistry,” Marquez’s team developed a design that was adopted by ladrilleros in Ciudad Juárez and has been built throughout Mexico and other parts of the world.

The development of this innovative brick kiln design coincided with the ongoing efforts in the region to reframe transboundary air pollution abatement. Discussions within the Paso del Norte Air Quality Task Force and subsequently within the JAC explored the promise of cross-border emissions credit trading for companies in the air basin. In 1999, EPE saw the opportunity and had the economic imperative to bring together this brick kiln technology and the cross-border emissions credit trading concept. Drawing on years of collaborative efforts and political support on both sides of the border, EPE and its many fronterizo partners worked through the necessary steps and barriers to execute the first international emissions credit trading project along the U.S.-Mexico border.

Although the EPE IERC model has not been replicated in the years since, it serves as an important demonstration project. It is not clear why this concept was not replicated by others along the border. Some have suggested that the onset of homeland security anti-terrorist protocols along the border changed the tone of cross-border cooperation. Perhaps the political urgency around border environmental protection subsided in the years following the passage of NAFTA. Maybe the IERCs posed a perceived threat to federal jurisdictions and national sovereignty. Perhaps some internalized it as unnecessary meddling in a neighbor’s problem.

Regardless of reasons, the IERCs remain a valuable tool for transboundary air pollution abatement along the U.S.-Mexico border and other borders where these challenges and opportunities continue to exist today. With the threats of climate change upon us, the EPE IERC serves as a ready example of an innovative way to leverage limited pollution abatement
resources to reduce emissions while improving the lives of those most vulnerable in our communities. Applied more generally, IERCs would allow companies, communities and regulators to bring critical resources to those low-income communities that are most exposed to high levels of air pollutants. Investments in basic infrastructure improvements like utility connections, paved roads, and trash disposal services would significantly reduce pollution sources and markedly improve their quality of life. This would require a true transboundary mentality among air quality regulators as well as the leadership of fronterizo companies and communities.
Chapter Six: *Frontera* Collaborators and Stakeholders

In any sustained and fruitful community-led effort, there are individuals who drive initiatives, agendas, and deliverables. That was certainly the case for the PDNAQTF. Absent the talent, dedication, and passion of a number of key individuals, the PDNAQTF would not have accomplished what they did. The projects they set out to complete benefited from their collective business acumen, technical expertise, professional networks, and skill to navigate the labyrinth of bureaucracies in two countries. These individuals volunteered their time or stretched the bounds of their official job descriptions in order to facilitate the innovative cross-border collaborations explored in this dissertation. As noted in chapter four, there were dozens of Task Force members who championed and contributed to projects, therefore it is not feasible to develop comprehensive profiles of all of them. This chapter allows us to get to know a few of them by giving us some insight into their personal and professional backgrounds.

I selected five individuals who had critical roles within the Task Force and who lived in the air basin, given the importance of the *fronterizo*-led aspect of this initiative. Two of them served as chairs of the organization, another two held critical positions in local government, and the last was an NGO representative whose time was dedicated to this effort. I had the opportunity to interview all of them between 1996 and 1998, when the work of the Task Force was at its peak and the JAC was commencing its operations. I was able to interview three of them once again between 2015 and 2021. These profiles reveal the motivations, frustrations, and anecdotes that the Task Force members shared during their oral interviews. These first-person perspectives reflect the diverse group of *fronterizos* who shared a goal of reframing transboundary environmental governance and improving air quality for their community.
Dr. Elaine Mowinski Barrón grew up in a Polish-American household in a suburb of Cleveland - Maple Heights, Ohio. Mowinski Barrón attended the St. Alexis School of Nursing in downtown Cleveland, where she recalled returning to her car at the end of the day to find it covered in soot from the surrounding steel factories. It was as a nursing student in this heavily industrialized city that she began to see patients with lung ailments caused by exposure to hazardous air emissions in their workplaces and in the neighborhoods adjacent to steel factories. Mowinski Barrón subsequently moved to Detroit, Michigan, where she described the existence of similar air pollution problems and related health issues among its residents.338

Mowinski Barrón moved to El Paso in 1974 with her husband, Dr. Miguel Luis Barrón, a cardiovascular-thoracic surgeon who was initiating his medical career. Having earned a diploma in nursing in Cleveland, Mowinski Barrón wanted to continue her studies at UTEP to become a registered nurse. After completing her bachelor’s and master’s degrees in nursing at UTEP, she became an intensive care nurse and taught nursing courses. Before long, this determined professional working mother deciding to pursue her life-long dream of becoming a doctor. Living in El Paso, her only option to do that was to attend medical school at the Universidad Autónoma de Ciudad Juárez. Despite not being a native-born fronteriza, Mowinski Barrón was undaunted by the idea of crossing the border to attend medical school and take courses in another language. Her Spanish skills were limited and she described “taking hours to read one or two pages” of medical texts. Nevertheless, she credits the two years of Spanish and Latin courses she was required to take in high school for enabling her to make it through her medical program.

338 Mowinski Barrón Interview, October 6, 2015.
This cross-border educational experience was culturally formative and no doubt helped prepare Mowinski Barrón for her leadership role with the Task Force.\footnote{Ibid.}

As a part of her medical education, Mowinski Barrón provided one year of service work (\textit{servicio social}) at the Centro Medico del Valle, a unit of the United States Public Health Clinics. Normally this type of service was rendered in Mexico, but she was allowed to provide her year of service in El Paso. Located in the lower valley of El Paso near the Mount Carmel Cemetery, this clinic provided medical services to uninsured patients who were primarily from low income and Mexican immigrant backgrounds. She earned her medical degree in 1985 and went on to complete her internship and residency in internal medicine at Texas Tech Medical School in El Paso in 1988.\footnote{Ibid.}

As she recalled seeing patients as a medical doctor at the Centro Medico del Valle, she described an elderly man who had worked at ASARCO for over thirty years, whom she “will never forget.” With tears in her eyes, Mowinski Barrón described how this man told her how sick he was, and “he brought his handkerchief with the blood and tiny pieces of metal that he had coughed up.” Her experience treating patients in her practice and in the emergency room informed and guided her public service. Reflecting on her motivation for the decades of volunteer service, she said, “I’ve always wanted to bring in the health aspects of any decision that was being made.”\footnote{Mowinski Barrón Interview, Oct. 6, 2015. Dr. Carlos Rincón, Regional Director, United States Environmental Protection Agency Border Office, interview by author, El Paso, TX, November 16, 2015.}

Mowinski Barrón served as the founding chairperson of the TACB Advisory Committee and the PDNAQTF from 1993 through 1994. She also served on the JAC from 1996 through 2019. When asked to reflect on her role chairing the first TACB Advisory Committee meeting
in May 1993, she described a difficult start with a room full of people assigning blame for the region’s air pollution issues. “It came to the point where I said this is not a meeting to point fingers, this is a meeting to find solutions,” Mowinski Barrón recalled. The initial meetings of the Advisory Committee lasted entire work days, as participants worked through establishing the priority project lists. Mowinski Barrón added, “we created a model where we listened to all parties involved to try to come up with a central mission. That is needed for long-term improvements given all of the contamination that continues to occur from many different sources.” Several individuals who were involved in those initial meetings of the Task Force believe this approach was the reason the group was able to coalesce around specific pollution abatement projects rather than becoming ensnared in questions of blame and responsibility.342

Mowinski Barrón’s record of public service is extensive and spans numerous local, state, and national boards related to environmental health and protection of natural resources. In 1998, she served as president of the El Paso County Medical Society, having served in numerous other leadership positions within the organization since 1994. She utilized her medical expertise to assist with the roll-out of a Medicaid Managed Care model as well as the state’s children’s health insurance program (CHIP). She also served as the chair of the Public Service Board for the El Paso Water Utilities from 2003-2004 and chair of the El Paso City-County Health and Environmental District from 2006-2007. At the state level, following Mowinski Barrón’s appointment to the Texas Air Control Board, Governor Ann Richards appointed her to the Texas

Water Development Board from 1994-2000. Within the Texas Medical Association, she served as the designated chairperson for the Committee on Environment in 1998 and as an appointee to the Council on Public Health from 1998 through 2006. Her involvement with the PDNAQTF and the JAC brought her to the attention of key officials within the U.S. Environmental Protection Agency (EPA) who appointed her to the National Environmental Justice Advisory Committee, Air-Water subcommittee from 1998 through 2002. She was also appointed to the U.S. EPA’s Clean Air Act Advisory Committee from 1999 until 2010.343

Mowinski Barrón explained that over years of exposure to several board chairs who set very high expectations for outcomes, she developed stronger strategic problem solving and project management skills. The professional staff who supported those boards also helped her become more knowledgeable in key content areas including environmental health and natural resource management. Tying it back to her role within the Task Force and the JAC, she shared “the information I was being fed by all of these agencies and experts was phenomenal. I think that helped with the formation of what needed to be done at that time.”344

When asked what she considered to be her biggest accomplishment and legacy related to her work with the PDNAQTF, she was quick to refer the work of all of the members, “I think it is always a joint effort. I think the whole task force should be proud that we made improvements. We needed everybody – you can’t do that alone.” As the interview concluded in 2015, she insisted that the work of the PDNAQTF was as relevant then as it was in 1993. “The task force was critical to provide important evaluation of contamination, to speak to the strategic

344 Ibid.
placement of new industry, housing, so that we are minimizing exposure to harmful pollutants.”

DANNY VICKERS

Danny Vickers, born in Wuerzburg, Germany, grew up in a military family and lived on army bases all over the world until he was in the sixth grade. When his father retired from the Army they returned to his hometown of Monroe, Louisiana. At that time, the local school district was in the process of desegregating their schools. Vickers had attended integrated schools on Army bases his entire life, so it was not a shock to him. Unfortunately, the resistance to integration in Monroe was so strong that “it caused the school system to collapse,” Vickers recalled. Concerned for his safety and his education, Vickers’s parents sent him to El Paso to live with an aunt and uncle. Vickers attended Irvin High School in Northeast El Paso and eventually went on to attend UTEP. “El Paso became my home,” shared Vickers. He graduated with a bachelor of business administration in finance and accounting in 1978 and later returned to earn his master of science in economics degree.

When he graduated with his business degree, Vickers went to work for a locally-owned computer software company that allowed him to travel the world setting up product distribution. Drawing on his years of living abroad and his experience doing business in other countries, in 1985 he decided to begin his own venture and established an import/export company that traded primarily with Asia and Mexico. After three years, Vickers decided this import/exports business was not for him and returned to UTEP to pursue his graduate degree in economics. After

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345 Mowinski Barrón Interview, Oct. 6, 2015.
completing his coursework, Vickers started a data services company in Ciudad Juárez with three partners, including three Mexican businessmen and the person who had offered him his first job out of college. Together, they built EDM International in three locations in northern Mexico and it grew to 3,500 employees - 1900 of which were in Ciudad Juárez. They offered back-office services including billing and customer service to large U.S. firms like General Electric and Federal Express. Vickers considered himself an entrepreneur and a builder. He also considered himself lucky that all of his clients were outside of the region because it gave him the freedom he needed to be vocal in the community without fear of losing business.347

After launching EDM International in Ciudad Juárez, Vickers became involved in civic organizations like the Sunturions and business groups including the El Paso Foreign Trade Association (FTA) and the Greater El Paso Chamber of Commerce. The FTA was a business organization comprised primarily of U.S.-based maquiladora executives. Perhaps because of his outspoken and direct nature, Vickers was asked to serve as the environmental representative for the FTA. In this role he was the liaison between the Mexican environmental authorities and the 330 U.S.-based maquiladoras in Ciudad Juárez. It was his responsibility to follow up on any information they received from officials regarding possible environmental violations in a maquiladora operation. He was charged with contacting the maquiladora in question and pressuring them into compliance. Vickers says that Charles Dodson, the FTA president at that time, was adamant that if they found a maquiladora violating environmental regulations, “we will hammer them.” According to Vickers, Dodson and the FTA were mindful that if any maquiladoras were found to be violating environmental laws, it would reflect badly on all of them. When asked if this sort of self-regulation was effective, Vickers responded, “I think so…it

347 Danny Vickers, former PDNAQTF Chair and JAC member, phone interview by author, October 17, 2021.
was the best we had at the time.” Given the lack of environmental enforcement staff in Ciudad Juárez, the FTA did what it could to encourage compliance in the maquiladora community and minimize scrutiny of their operations.348

It was through this role that Vickers learned about plans for the TACB Advisory Committee from EDF’s Dr. Pete Emerson. He felt it was important to participate because he was concerned that El Paso would lose highway construction dollars due to its non-attainment status. He quickly became a leader within this initiative and served as interim chair/chair of the Paso del Norte Air Quality Task Force from 1994 through 1996. Thereafter, he served on the JAC until 2002. Vickers was outspoken and direct in his interactions with U.S. federal officials, whom he felt initially had no real interest in helping the region. Although he remained frustrated with the pace at which projects like the IAQMD progressed, eventually he became convinced of the sincere commitment of individuals like U.S. EPA’s Jim Yarbrough. He was also impressed by the efforts of local and state-level government officials who were willing to push the bounds of their traditional roles to address the region’s air quality issues. The minutes of the TACB Advisory Committee, the Task Force and the JAC document Vickers’s constant pressure on the coalition members to develop solutions, to push harder on bureaucratic barriers, and to demand accountability from the public and private sectors.349

In addition to his volunteer work related to the environment, Vickers was also involved in numerous education related initiatives. He believed that the root cause of the region’s many issues was poverty and the best way to address poverty was through education. He was actively involved with UTEP’s El Paso Collaborative for Academic Excellence as well as the Alliance

348 Danny Vickers, former PDNAQTF Chair and JAC member, phone interview by author, October 17, 2021.
Schools program. His company partnered with Ysleta Elementary School so that they could receive a federal grant through the Alliance Schools program to help educate parents on ways in which they could support their children’s education and demand accountability from the school system. Some of his involvement in Alliance Schools is documented in Kathleen Staudt’s book *Hope for Justice and Power: Broadbased Community Organizing in Texas*. He was also appointed by Governors George W. Bush and Rick Perry to serve as a business representative on several education task forces.350

Despite his long-term commitment to the efforts of the Task Force and the JAC, Vickers expressed frustration with the magnitude of the region’s challenges and the lack of resources available to address them. He questioned how it was that his company was paying 5% of its payroll into INFONAVIT but none of his employees had received this benefit. Vickers shared that his company inquired with INFONAVIT as to why none of his employees had access to housing. He was advised that if his company would pay for the drawings for a new housing development in Ciudad Juárez, INFONAVIT would build the new housing and make some portion available to EDM International employees. He indicated that EDM did pay for the engineering work and eventually over 100 employees were able to access INFONAVIT homes.351

He also questioned why Mexican officials syphoned away the tolls collected at the region’s ports of entry rather than utilizing those funds to upgrade and expand the bridge

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351 Danny Vickers, former PDNAQTF Chair and JAC member, phone interview by author, October 17, 2021. INFONAVIT is the Instituto del Fondo Nacional de la Vivienda para los Trabajadores, a federal agency established to develop affordable housing and accessible mortgage products. Employers pay 5% of their payroll into this fund. Employees receive a credit for those contributions when they apply for available INFONAVIT housing or mortgage products.
infrastructure to improve mobility, commerce and air quality. In order to avoid closure of the Bridge of the Americas cargo lanes due structural issues, the FTA entered into an agreement with the IBWC to “tax” its own members in order to finance desperately needed bridge maintenance and expansion of the cargo lanes and inspection bays. For Vickers, these were examples of the chronic extraction of resources from Ciudad Juárez to Mexico City that worsened living conditions in Ciudad Juárez and the region. Until the federal governments properly allocated the rightful funds to the border region, Vickers reflected, these issues will continue to be a challenge.352

FRANCISCO J. NÚÑEZ

Francisco Núñez was born and reared in Ciudad Juárez. He left to pursue his college education at the Universidad Autónoma de México where he earned a degree in biology with an emphasis in environmental sciences in 1971. Núñez returned to Ciudad Juárez in the 1980s to work in the private sector before becoming the director of water treatment for the Junta Municipal de Agua y Saneamiento (Junta de Aguas), a state enterprise that oversees water and wastewater services for Ciudad Juárez. In 1992, when the newly elected municipal president Francisco Villarreal Torres took office, he pledged to build a department to oversee environmental issues for the city. He reached out to Núñez and asked him to spearhead the development of this office. Villarreal did not have a budget to create this department but, according to Núñez, he offered his own salary to launch this effort. For Villarreal, improving the

352 Danny Vickers, former PDNAQTF Chair and JAC member, phone interview by author, October 17, 2021. Caminos y Puentes Federales (CAPUFE) was responsible for managing the bridge tolls in Ciudad Juárez. More about the agreement between the FTA and IBWC can be found in the proceedings of the 1993 U.S. House of Representatives Hearings for the Committee on Appropriations, Subcommittee on the Departments of Commerce, Justice and State, the Judiciary and Related Agencies.
environment was fundamental to improving the quality of life for Juarenzes. He also wanted to encourage public engagement with the municipal government. Núñez agreed to work with Villarreal to build this new department on a voluntary basis while continuing to serve as director of the Junta de Aguas. He described working evenings and weekends to develop the structure for this new department with a focus on sustainable development.353

In March 1993, when Núñez learned about the TACB’s interest in developing a binational advisory board in the region he was excited to participate. Although his experience was in water and not air, he felt that it was an opportunity to learn from this state agency how to engage the public in their mission. This was something he wanted to build into the framework for the new Dirección de Ecología for Ciudad Juárez but was not sure how to do it. He reminded me that public engagement and government transparency like what is afforded through the Freedom of Information Act in the U.S. did not exist in Mexico. Núñez was also excited to learn from experts in air quality and engage in a binational forum with multiple levels of governmental as well as the NGO and business community.354

Consistent with the meeting minutes, the interview with Núñez reflected his vocal support for the Task Force and its transboundary initiatives. He described the community involvement with the Task Force as “explosive,” with 60-80 attendees working through 3-4 hour meetings to advance projects, identify funding sources and develop execution strategies. He compared the Task Force to a clock – a mechanism that required all of the gears and parts working together to make it function properly. He credited the EDF, the U.S. EPA, and several Texas state entities for identifying and securing funding sources for many initiatives. However,

353 Francisco J. Núñez, Director de Saneamiento, Junta Municipal de Agua y Saneamiento, Ciudad Juárez, Chihuahua, interview by author, April 18, 1996. He also mentioned serving as a technical advisor to the Comisión Nacional de Agua and for the Secretaría de Relaciones Exteriores. Translation of interview by author.
354 Ibid.
he emphasized that without local government officials in Ciudad Juárez and El Paso, including himself and Jesus Reynoso, who had developed trust relationships over many years and were willing to work together to find solutions, the Task Force would not have been successful. In other words, in his estimation the willing disposition and participation of local government officials in the Task Force served as the critical foundation upon which they could build their projects.\(^{355}\)

Núñez shared that he had to do a significant amount of convincing over the course of the Task Force’s first year to get Mexican federal and state officials committed to the coalition. As mentioned earlier, Mexican government officials were not accustomed to participating in forums with the public and non-governmental entities. They were also sensitive to U.S. meddling into environmental issues that were clearly their jurisdiction – even if they were not doing anything to address those issues. He explained that early on, there were collaborative projects proposed through the Task Force that progressed because they were “approved” by the Ciudad Juárez municipal government without the official approval from the federal government. Their approach seemed to be one of asking for forgiveness rather than asking for permission with regard to these projects. He felt that the “Washington boys” and the “chicos del D.F.” did not understand the urgency of what was happening on the border, therefore it was incumbent on the local governments to make things happen. Based on his experience, it was a better strategy to move forward with innovative collaborations because once Mexican federal officials learned about the initiatives that were ongoing in Ciudad Juárez they were generally supportive.\(^{356}\)

Núñez continued to serve in dual roles with the Junta de Aguas and the Dirección de Ecología for almost four years. In late 1996, the Municipio de Ciudad Juárez finally funded the

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\(^{355}\) Ibid.  
\(^{356}\) Ibid.
department and hired a full-time director, Oscar Hernández Ibañez. According to other Task Force members interviewed for this study, Núñez’s energy and commitment over that period of time was indeed critical to this binational initiative. With the clear directive from Villarreal, Núñez was eager to partner with his U.S. counterparts to move projects forward and develop the capacity necessary to build a functional environmental department for Ciudad Juárez.357

**JESUS “CHUY” REYNOSO**

Jesus Reynoso was born in Ciudad Juárez and grew up in El Paso. He studied engineering at UTEP and subsequently earned a management degree from Park University. He was a part of El Paso County’s air quality monitoring efforts since they began in 1968, when he and a chemist were charged with complying with the monitoring requirements of the Clean Air Act. Starting in 1979, Reynoso served as El Paso City County Health and Environmental District’s (EPCCHED) environmental health program manager and had been an integral part of developing El Paso County’s pollution abatement plans. These included mandating oxygenated gasoline and vehicle emissions testing, converting public fleets to cleaner fuels, paving alleys and reducing open burning.358

In 1989, Reynoso’s team worked with the U.S. EPA to set up air monitoring stations in Ciudad Juárez. At that time, Ciudad Juárez did not have any air monitoring stations in place nor did they have the technical staff to operate the equipment. It was important for Ciudad Juárez to have the monitoring stations and to have uniform measuring parameters across the air basin in

order to have a more accurate reading of the region’s air pollution. According to Reynoso, the initial arrangement between the U.S. EPA and the Secretaria de Desarrollo Social (SEDESOL) was that the U.S. EPA would purchase the equipment, install it in Ciudad Juárez and train Mexican staff to operate the equipment. The EPCCHED was to assist the Mexican technicians until they were ready to assume responsibility for operating the equipment on their own. Reynoso shared that SEDESOL staff came from Mexico City to receive training and promptly returned to Mexico City, leaving no staff capacity in Ciudad Juárez to operate the equipment. Since air quality monitoring was a function of the Mexican federal government, the Municipio de Ciudad Juárez did not have the funding, staff or authority to assume this responsibility. This meant that the EPCCHED went from assisting with the air monitoring stations to managing them altogether.359

In 1998, Reynoso’s team was still managing three air monitoring stations in Ciudad Juárez because Mexican federal officials had not dedicated the resources to assume operations. He expressed frustration with those officials who “really don’t care about what is happening in Juárez.” To further prove his point, he indicated that federal officials were running air monitoring systems in Guadalajara and Monterrey but would not take ownership of the system in Ciudad Juárez. Although he qualified his statements to indicate that there are some individuals in the Instituto Nacional de Ecología (INE) who were genuinely interested in helping, Procuraduría Federal de Protección al Ambiente (PROFEPA) was largely unwilling to do anything and unwilling to let anyone else do anything. The context here is that when SEDESOL was restructured in the early 1990s, environmental policy moved to a new agency called INE and environmental enforcement was assumed by PROFEPA. According to Reynoso, PROFEPA was

359 Jesus Reynoso, El Paso City County Health and Environmental District’s environmental health program manager, interview by author, February 16, 1998, El Paso, Texas.
compelled to continue with the transboundary projects that SEDESOL had approved and initiated but certain PROFEPA officials were unwilling to expand that collaboration either due to a lack of commitment or resources – or both. He felt that until there was a change in leadership in PROFEPA, the JAC would be limited in what they could accomplish.

For Reynoso, this meant that the municipal government officials in Ciudad Juárez, with whom he worked regularly, had their hands tied. They were limited in what they were able to do despite their disposition to assume greater monitoring and enforcement authority. Although these conclusions seem to contradict Núñez regarding Ciudad Juárez’s ability to work through the necessary approvals, it is important to note that Reynoso’s interview took place almost two years after Núñez’s interview and more than a full year after the initiation of the JAC in which PROFEPA had an official role. Like Vickers, Reynoso lamented the lack of investment in Ciudad Juárez for basic things like trash collection services so that people would not need to burn their trash and road paving that would significantly reduce particulate matter. Because of the work he had done in El Paso, he knew there were simple solutions to address the many of the emissions sources in Ciudad Juárez but there were insufficient funds to implement them. For Reynoso, the sense of accomplishment related to the Task Force’s initiatives and his feelings regarding the potential for the JAC were muted by his belief that real change required a true commitment from all stakeholders and that commitment was missing from some.360

Reynoso was a member of the TACB Advisory Committee and the Task Force from 1993 through 1998, when he was appointed to serve on the JAC. Despite his obvious frustration, the minutes of the meetings for these organizations reflect that Reynoso was a consistent contributor to and facilitator of transboundary pollution abatement projects. Francisco Núñez described

360 Ibid.
Reynoso as a steadfast supporter and partner who readily shared his department’s technical resources and the lessons learned in El Paso in order to help Ciudad Juárez build its capacity. Reflecting on his involvement with this coalition, Reynoso said he did not “get paid more or less if they got a project done.” His motivation for continuing to participate despite the setbacks was to make progress for the region he called home.361

**DR. CARLOS RINCÓN**

Dr. Carlos Rincón was born in Jerez, Zacatecas into a family of 9 siblings. His parents owned a small store that served the surrounding rural agricultural communities. When he was a teen, a series of droughts devastated the agricultural community and forced his family to migrate to southern California, where his mother’s extended family lived. He graduated from high school in Anaheim then returned to Zacatecas to complete his high school equivalency there so that he could begin university studies in Mexico. He earned his undergraduate degree in agricultural engineering at the Escuela Superior de Agricultura Hermanos Escobar in Ciudad Juárez. He went on to earn his master of science degree in water and soils use and a Ph.D. in hydrology and water resources at the Instituto Tecnológico de Estudios Superiores in Monterrey, Nuevo León. Rincón worked as a consultant in the U.S. for an international seed company before returning to Ciudad Juárez in 1992. He learned about the Task Force through acquaintances and began to attend the meetings in November 1993. In 1994, EDF hired Rincón to serve as a program director and established an office in El Paso to support the work of the Task Force. From 1994 until 1996, Rincón provided administrative support for a number of the Task Force’s projects.

361 Jesus Reynoso, El Paso City County Health and Environmental District’s environmental health program manager, interview by author, February 16, 1998, El Paso, Texas. Francisco J. Núñez, Director de Saneamiento, Junta Municipal de Agua y Saneamiento, Ciudad Juárez, Chihuahua, interview by author, April 18, 1996.
and served as a liaison between the border region and EDF’s network of resources. He was appointed as a U.S. member of the JAC in 1996 and continues to serve today. In 2005, Rincón became the director of the U.S.-Mexico Border Program Office for the U.S. EPA.\textsuperscript{362}

Rincón said his role with EDF was to help stakeholders in the region push governments to do what they should be doing regarding air quality governance. He welcomed the opportunity to work for a national NGO and partner with academic institutions, government agencies and private citizens to improve conditions for his family and every resident of the air basin. One of the most satisfying aspects of the work for him was that “every project was a win-win proposition because no matter where it was located, the entire region would benefit from the emissions reductions.” He was also motivated to be a part of a coalition that was developing an unprecedented and innovative framework to manage transboundary air resources. For him, the IAQMD which was not just another project, it represented a shift in governance and held the promise of fundamental change.\textsuperscript{363}

When asked about his biggest frustrations, Rincón shared that he was disappointed that some of the policy tools that the Task Force and the JAC advocated for and utilized for transboundary resource management had not been more widely employed along the border. Instruments like the IERCs that enabled the brick kiln project discussed in Chapter 5 and international supplemental environmental projects (ISEPs) allowed border communities to develop projects that leveraged limited resources and addressed significant environmental challenges. He lamented that the disposition for involvement in those types of innovative projects seemed to be driven by the threat of sanctions related to non-attainment status rather


\textsuperscript{363} Ibid.
than a fundamental desire to address environmental issues. Said differently, only when border communities were non-attainment and those threats of sanctions were present were key stakeholders, namely U.S. state governments, willing to engage these instruments.  

Rincón most emphasized the importance of an engaged civil society, particularly in a place like the Paso del Norte region where recurring changes in multiple levels of government leadership could make long-term goals more difficult to achieve. The sustained involvement of individuals including Mowinski Barrón, Vickers, Reynoso, Núñez and others ensured that initiatives like the IAQMD persisted from one administration to the next. Of course, Rincón’s sustained involvement in this regional collaboration is unparalleled. According to Rincón, this long standing service and commitment to a shared goal also facilitated the development of trust relationships between individuals who were in positions to make things happen. These trust relationships were particularly important, he believed, because many of the Task Force projects involved multiple partners and champions located across sectors and jurisdictions.

**CONCLUSION**

In 2009, researchers with the Center for Technology in Government at the University at Albany, SUNY published a report titled “Mitigating Cross-Border Air Pollution: The Power of a Network.” This study examined the JAC to identify the key components of its success and whether this model could be useful for improving air quality in other cross-border air sheds. The

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364 Ibid. Supplemental environmental projects (SEPs) are regulatory mechanisms employed by the U.S. EPA and state environmental authorities to settle cases in which state or federal environmental laws or regulations have been violated. SEPs are intended to assist communities in recovering from the environmental damage caused by the violator. They give violators the option to carry out an environmentally beneficial project in the community where the violation occurred in exchange for a partial reduction in the fine imposed by the agency. ISEPs allow violators to carry out environmentally beneficial projects in adjacent communities in another country.

365 Rincón, interview by author, El Paso, TX, November 16, 2015 and October 18, 2021.
report’s authors found that the JAC had been successful because of a unique confluence of critical factors. One of those factors was that the JAC drew from a large pool of passionate and motivated individuals who were experts in diverse fields. They also referenced the strong trust relationships and an effective organizational structure that emphasized an inclusive approach to problem solving. The observations in this report are consistent with the conclusions regarding the effectiveness of this *fronterizo* epistemic community presented in Chapter 4. They are also reflective of the thoughts and anecdotes shared by the Task Force/JAC members highlighted in this chapter. These profiles illustrate the commitment of a diverse group of people from different sectors who shared a goal and persisted in their pursuit of that goal despite many setbacks, frustrations, and institutional barriers.\textsuperscript{366}

Conclusion

In her seminal work, *Borderlands/La Frontera: The New Mestiza*, the Chicana poet and author Gloria Anzaldúa wrote:

The U.S.-Mexico border *es una herida abierta* where the Third World grates against the first and bleeds. And before a scab forms it hemorrhages again, the lifeblood of two worlds merging to form a third country – a border culture…A borderland is a vague and undetermined place created by the emotional residue of an unnatural boundary. Anzaldua’s words, though jarring and vivid, capture the *fronterizo* experience quite appropriately. Her analogy resonates whether one considers it from the perspective of the industrialization and the environmental fallout along the border or in the context of *fronterizo* identity formation. For the Paso del Norte region, which had been a strategic location for migration for thousands of years, the imposition of an international boundary in 1848 brought with it a series of treaties, regulatory structures, and unnatural barriers that initiated the grating that Anzaldúa describes. It was the beginning of what Juan Mora-Torres calls a contact zone, within which *fronterizos* were forced to protect themselves, create their own economies, and develop their own social structures, irrespective of the nation states that claimed separate portions of the region. This new reality became the foundation of a border culture and a *fronterizo* identity.

Over the course of the next century and a half, the region was transformed as U.S. financial interests built railroad networks that connected it to the U.S. coasts and the interior of Mexico, thereby facilitating the extraction and exploitation of natural resources and labor. The flourishing mining and smelting industries were joined by the agriculture and manufacturing

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industries that would similarly benefit from the transportation network and the abundance of labor, often at the expense of a hemorrhaging border community.

The region’s transformation was particularly marked between 1940 and 2000 as a result of several bilateral treaties and economic agreements, including the Bracero Program, the Border Industrialization Program (BIP), and the North American Free Trade Agreement (NAFTA). These agreements catalyzed an unsustainable population growth and industrialization that expanded the urban footprint beyond the available infrastructure resources. The region’s population grew from over 145,000 in 1940 to almost 1.8 million in 2000, with 1.2 million residing in Ciudad Juárez. By the end of the 20th century the Paso del Norte region had become a global manufacturing hub overwhelmed by mass migration, depressed wages, and a woefully insufficient public infrastructure that created unsafe and unhealthy living conditions for all of its residents. One of the deleterious outcomes of this unfettered growth was the deterioration of the air quality within the shared air basin. The sister cities of El Paso and Ciudad Juárez had the worst air pollution along the border and each city ranked among the most polluted in its respective country.

Over the course of the late 19th century and throughout the twentieth, the treaties and policies that governed the international boundary and transboundary natural resources evolved slowly. Initially, treaties like the one that established the International Boundary Commission were created to strengthen the sovereignty and power of the federal governments on either side of the nascent boundary. Over time, the focus of these agreements shifted to create mutual, albeit disparate, benefit in economic and environmental spheres. The changes in the bilateral environmental agreements were prompted by fronterizos who demanded changes in governance structures and protective mechanisms for their environment, their natural resources, and their
quality of life. Through their activism and protests, communities spanning the U.S.-Mexico border made their concerns central to the economic discourse of the nation-states. It was because of these efforts that the U.S. and Mexico began to shift from boundary-focused agreements to agreements that acknowledged and encouraged collaboration in the protection of the border region’s environmental resources. The most significant of those environmental agreements was the Agreement Between the Government of the United States of America and the Government of the United Mexican States on Cooperation for the Protection and Improvement of the Environment in Border Areas, also known as the La Paz Agreement of 1983.

Despite the La Paz Agreement and numerous annexes, federal policies in both countries continued to subject border residents to an inordinate environmental burden in the name of national security, free trade, and economic development. As a result of federal customs policies and woefully inadequate investment in trade-related infrastructure, border communities were contaminated by thousands of tons of toxic emissions. For those low-income, minority communities located adjacent to ports of entry, the inequitable exposure to environmental hazards was even more pronounced. Furthermore, weak environmental regulations and insufficient investment in environmental enforcement resources enabled polluters ranging from multinational corporations to family-owned brick kilns to pollute border communities with minimal, if any, accountability.

During the early 1990s, as the United States, Mexico, and Canada were in the midst of NAFTA negotiations, environmental and labor activists and grassroots organizations throughout the North American continent mobilized to block passage of the trade agreement. For fronterizos in the Paso del Norte region and their allies, these international debates regarding trade and border environmental conditions provided the necessary context to pressure federal and state
officials in the U.S. and Mexico to support the projects and initiatives they believed would help address their environmental challenges.

As residents of the Paso del Norte air basin suffered from air pollution-related health problems and industry faced government-imposed limitations to growth due to El Paso’s non-attainment status, unilateral air quality governance measures failed to address growing transboundary challenges. Given the air quality conditions and the obvious ineffectiveness of government oversight, many concerned fronterizos from various sectors of the community initiated projects and investigations aimed at improving their region's air quality. Drawing on their fronterizo identity, these individuals and organizations took it upon themselves to seek solutions.

In 1993, their efforts coalesced within the Paso del Norte Air Quality Task Force (Task Force), a multisector, binational, tristate environmental advocacy group. The Task Force included local, state, and federal government officials, researchers, business leaders, healthcare providers, and NGOs with a wide range of expertise and a common interest in improving the conditions in the air basin. Over many years, this fronterizo epistemic community developed and carried out projects intended to address some aspect of the region’s air quality challenges. The most significant of these projects was the creation of an international air quality management district. The IAQMD was envisioned as a formalized agreement through which local, state, and federal government regulators together with local stakeholders would jointly manage the transboundary air basin.

In response to a persistent multi-sectoral, frontera-based advocacy effort championed by the Task Force, the U.S. and Mexico adopted Appendix 1 to Annex V of the La Paz Agreement, which created the Joint Advisory Committee on the Air Quality Improvement for the El Paso –
Ciudad Juárez – Doña County Air Quality Management Basin (JAC). Although it was not the management district that the Task Force sought, the JAC was a significant victory for Paso del Norte residents because it provided them with a legally recognized mechanism within which to work as a binational community in matters of transboundary air pollution. In many ways, the JAC became the next evolution of the epistemic community created by the Task Force. It served as a binational coordinating body that effectuated policies and facilitated projects that improved the region’s air quality and helped the air basin achieve compliance with air quality standards in both countries.

Beyond the Paso del Norte air basin, there was a broader acknowledgement of the value of the multisector engagement and the synergies created by the Task Force and subsequently the JAC. This model of frontera-based advocacy and involvement became the new standard for border environmental governance. In 2003, the US and Mexico adopted the Border 2012 program- a plan that incorporated a frontera-based approach that focused on the environmental needs of border residents. The Border 2012 program featured multi-stakeholder task forces for water, air, solid waste and other areas of environmental management that resembled the JAC. The Border 2020 program contained this same task force structure, as does the current Border 2025 program. These task forces and working groups representing sister communities along the border have informed the binational environmental project priorities adopted by the U.S. EPA and Mexico’s SEMARNAP for almost two decades. The JAC structure was even suggested as a viable model to address transboundary air pollution challenges in the Hong Kong-Guangdong
region, where two governmental systems struggle to address air quality as well as multi-

stakeholder inclusion.\textsuperscript{368}

While this dissertation demonstrates that the JAC represented a significant transformation in the way in which the U.S. and Mexican governments approached border environmental governance, it is clear that this transformation addressed only one aspect of a complex problem. This dissertation argues that the progress made in border environmental governance and policy development did not translate into progress in federal appropriations. The decisions regarding federal spending for border environmental infrastructure and regulatory enforcement were and continue to be made thousands of miles away, where \textit{fronterizos} have had limited input and influence. For decades, border communities have lived with an inordinate and unjust burden of trade-related pollution due to a misalignment of economic imperatives with the infrastructure necessary to manage the demands of a globalized economy. In order to realize significant change, the transformations in the border environmental policy process must be coupled with sustained and targeted investment of federal resources in the critical infrastructure that addresses the environmental and human health needs of \textit{fronterizos}.

This dissertation adds a significant narrative to the border environmental historiography, particularly as it relates to transboundary air resources and cross-border collaboration. It demonstrates an inextricable connection between \textit{fronterizo} identity and a community driven to develop environmental solutions for its shared air basin. It documents the formation of a unique and powerful epistemic community that forced the reframing of border environmental governance. The concepts of \textit{fronterizo} identity and epistemic communities each provide a

promising framework for considering different areas of inquiry in borderlands research. In environmental history, the concept of epistemic communities provides a particularly valuable construct because of the interdisciplinary nature of that field. It is quite likely that epistemic communities have existed in relation to other shared natural resources such as wetlands, aquifers, forests, and migratory animals. *Fronterizo* identity is an appropriate framework for considering problem solving across international boundaries. It is applicable in areas where cross-border coalitions have materialized to address the critical needs of *fronterizos*, including public health initiatives like vector control and the treatment of drug-resistant infectious diseases such as tuberculosis.

Equally important, this dissertation serves as a reminder of the value in *fronterizo* epistemic communities and their potential for problem solving. As *fronterizos* continue to advocate for increased investment in the public infrastructure necessary to create livable environments, they benefit from the precedent established by the Task Force and the JAC for binational collaboration and deployment of innovative transboundary pollution abatement tools. With the challenges of continued population growth and the threats of climate change upon us, policy tools such as the international emissions reduction credits (IERCs) and international supplemental environmental projects (ISEPs) serve as a ready instruments that leverage limited pollution abatement resources.

For the Paso del Norte region and the Brownsville, Texas/Matamoros, Tamaulipas sister cities, two border communities which are facing worsening air quality and are on the brink of non-attainment status, the IERCs and ISEPs may be instrumental in reducing emissions.\(^\text{369}\) They

\(^{369}\) Martha Pskowski, “El Paso had 126 Elevated Pollution Days in 2020,” *El Paso Times*, October 5, 2021. Brownsville is referenced in the El Paso Times article as having the highest number of days of elevated pollution levels in the state in 2020.
enable companies, communities, and regulators to bring critical resources like utility connections, paved roads, and trash disposal services that would significantly reduce pollution sources to those low-income communities that are most exposed to high levels of air pollutants.

As we learned from the experience of the JAC, these non-traditional tools require significant leadership from *fronterizos* in the public and private sector on both sides of the border. They also require a shift in environmental policy from a focus on the typical jurisdiction-bound pollution control solutions to transboundary projects that create the most efficient and cost effective pollution reductions while markedly improve the quality of life for residents on both sides of the border.
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Glossary of Abbreviations

CAPUFE - Caminos y Puentes Federales
CO – carbon monoxide
EDF – Environmental Defense Fund
EPCCHED - El Paso City County Health and Environmental District
FEMAP - Federacion Mexicana de Asociaciones Privadas de Salud y Desarrollo Communitario
FTA – Foreign Trade Association, also El Paso Foreign Trade Association
HAPs – hazardous air pollutants
IAQMD – International Air Quality Management District
INE – Instituto Nacional de Ecologia
INFONAVIT - Instituto del Fondo Nacional de la Vivienda para los Trabajadores
NGO – non-governmental organization
NOx – nitrogen oxides
PDNAQTF – Paso del Norte Air Quality Task Force
PM-10 – particulate matter with inhalable particles that measure 10 microns in diameter or less
PROFEPA – Procuraduria Federal de Proteccion Ambiental
SEDESOL - Secretaría de Desarrollo Social
SEDUE - Secretaría de Desarrollo Urbano y Ecologia
SEMARNAP – Secretaría de Medio Ambiente, Recursos Naturales y Pesca
SRE – Mexico’s Secretaria de Relaciones Exteriores, counterpart to U.S. Department of State
TNRCC – Texas Natural Resources Conservation Commission
TACB – Texas Air Control Board
TCEQ - Texas Commission of Environmental Quality
U.S. EPA – United States Environmental Protection Agency
VOCs – volatile organic compounds
Vita

Laura Uribarri is Assistant Dean for the College of Business Administration at the University of Texas at El Paso. During her time with the College, she has managed the undergraduate and MBA programs. Currently, she is responsible for the College’s co-curricular programming and she oversees corporate partnerships and external communications. She is also Co-principal Investigator for a multi-year Prudential Grant for the initiative titled “Risk Management and Advancing Latinx in the Actuary Profession.”

She served as the Vice President of the Government Relations Division of the Greater El Paso Chamber of Commerce for several years before joining Mayor Joe Wardy’s Administration at the City of El Paso. Following her appointment in the Mayor’s Office, she joined El Paso Electric as their Senior Government Affairs Representative in Austin, Texas for two years.

She earned a Bachelor of Arts Degree in International Relations with honors from Stanford University. She holds a Master of Public Affairs Degree from the Lyndon Baines Johnson School of Public Affairs at The University of Texas at Austin as well as a Master of Arts in History from The University of Texas at El Paso.

Laura has co-taught the course “Global Compliance, Corporate Responsibility and Sustainability,” for the UTEP Executive MBA program. She has also given a lecture titled “Understanding the Legislative Process - Its Effects on Business and Society,” for the Texas Society of CPAs, El Paso Chapter – Continuing Education Series and the UTEP Accelerated and Executive MBA Business Law and Ethics classes since 2007.


Laura is a member of Executive Forum and the Paso Del Norte Stanford Alumni Club. She is a proud alumnus of the Texas Lyceum and Leadership El Paso. She currently serves on the board of directors of the El Paso Downtown Management District.