

Water, Housing, and Transportation in Mexico City during the Second Half of the Twentieth Century

Reed Battles

Every morning, Lupe Gonzalez wakes up before the sun rises to draw water for an entire day's chores from a single tap in the courtyard of a packed eighteen single-room unit housing complex in the middle of Mexico City. On Monday mornings, Lupe has a long, painful, and crowded commute by bus and train across the massive city to an upscale neighborhood where she washes clothes for two wealthy women. She may not be paid much, but at least she is guaranteed a steady supply of water, a vital life necessity that is sometimes inexplicably unavailable to her in her own neighborhood.¹ Unfortunately, Lupe's arduous journey to supply necessities is not unique to her life. Millions of citizens in Mexico City and its surrounding suburbs wake up unsure if their basic infrastructural needs will be met that day. In the second half of the twentieth century, Mexico City experienced massive population growth that put a strain on the available infrastructure. Although many members of the upper class saw this growth as a move towards modernity, they did not anticipate the lack of potable water, the overcrowded and dilapidated housing units, and the never-ending traffic jams that stemmed from this population explosion. The government's frenzied reaction to this growth and all the problems it created demonstrated its unpreparedness in a critical period of change. The unaddressed effects of the continuing strain on Mexico City's infrastructure, resulting from an increasing demand for water, housing, and transportation following the massive population boom in the second half of the twentieth century, underscore the inadequate and reactive policies implemented by the city government, which has failed to engage in effective long-term planning for the development of Mexico City.

Mexico City's Water Crisis

Arguably, one of the main duties of a government is to provide clean and accessible drinking water to all its citizens. Water proved to be a major factor in shaping how Mexico City developed in the second half of the twentieth century. Mexico City is sometimes referred to as the Federal District of Mexico, or "DF." The suburbs of Mexico City are

¹Judith Adler Hellman, "Survival in the Shantytown," in *Mexico Otherwise: Modern Mexico in the Eyes of Foreign Observers*, ed. Jürgen Buchenau (Albuquerque: University of New Mexico Press, 2005), 242-243.

Water, Housing, and Transportation in Mexico City

located almost entirely in the State of Mexico, which surrounds Mexico City on three sides. Mexico City and its suburbs make up the Mexico City Metropolitan Area, also referred to as the MCMA. The massive population growth that occurred during that period, in these areas specifically, demonstrated the weakness of the infrastructure operated by the capital of Mexico. Unchecked urban growth and sprawl created an unprecedented strain on urban and suburban water supplies.

Historically, Mexico City and its surrounding suburbs have received almost all water supplies from the aquifers in the Valley of Mexico. Due to the massive population growth in these areas, the exhaustion of the aquifers remained a constant worry for the government. At the end of the twentieth century, the city extracted water from said aquifers at a rate of 45 cubic meters every single second ($\text{m}^3 \text{s}^{-1}$).² The natural recharge rate sits at an alarmingly lower rate of $20 \text{ m}^3 \text{ s}^{-1}$, leaving a $25 \text{ m}^3 \text{ s}^{-1}$ deficit every year.³ The recharge rate of an aquifer is the natural process of surface water moving downward to become groundwater. Along with an eventual outcome of the city running out of water, the alarmingly high extraction rate creates even more ecological problems. The city sits on top of clay soil and when water gets pumped out of the ground at an excessive rate, the clay contracts “like a sponge left to dry in the sun.”⁴ This subsidence has caused the city to sink remarkably quickly. On average, most areas subside at an annual average of 10 cm; Mexico City, however, sank an estimated 10 m in the last century.⁵

This ground water extraction and its consequence of subsidence has left a strain on the infrastructure of the city, including water pipes. An estimated 30 percent of the water in the piping system is lost to leaky pipes.⁶ Due to an amalgamation of aggressive ground water extraction and the unaddressed leaky pipes, citizens at times have no access to running water. In an article describing life in the lower income neighborhoods of the city, Judith Adler Hellman describes the struggles of supplying water to all citizens. The Mexican woman highlighted in the article, Lupe Gonzalez, has access to a single water tap that is shared by eighteen separate families.⁷ Unfortunately and inexplicably, days go by

² Cecilia Tortajada and Enrique Castelán, “Water Management for a Megacity: Mexico City Metropolitan Area,” *Ambio* 32, no. 2 (2003): 125.

³ *Ibid.*

⁴ Joel Simon, “The Sinking City,” in *The Mexico Reader*, ed. Gilbert M. Joseph and Timothy J. Henderson (Durham: Duke University Press, 2002), 521.

⁵ Tortajada and Castelán, 125.

⁶ Simon, 521.

⁷ Hellman, 242.

where the housing complex, and sometimes the whole neighborhood, lacks running water.

The massive population growth has caused water shortages throughout the city and many areas of the metropolitan area have no access to plumbing or potable water. One of these cities in the metropolitan area is Ciudad Nezahualc6yotl (known as Ciudad Neza), a shanty town that grew up on the dried lake beds of Lake Texcoco. Here, the population exploded in the second half of the twentieth century, establishing Ciudad Neza as one of Mexico's largest cities. A city that grew too large before proper infrastructure could be established, Ciudad Neza represents an example of suburban cities in the Mexico City area that had no access to running water in the twentieth century. To combat the growing needs of water and the imminent loss of sources of ground water, the government of Mexico looked for new sources of water. Population growth had more profound effects than simply increasing the need for water in the valley. This unchecked urban sprawl leads to a decrease in the land's ability to absorb rainfall back into the water system, thus providing less water in the future.⁸ The lack of absorption of rainfall leads to more groundwater runoff, which increases rates of flooding, as well as the loss of precious water resources that the newly founded cities desperately need.

As early as 1942, the government of Mexico City, in an attempt to find new water sources for the city, focused on the Lerma Valley System, a river sixty-two kilometers away from the city. In its heyday, water pumped from the Lerma system had a flow rate of roughly $14 \text{ m}^3 \text{ s}^{-1}$.⁹ Unfortunately for Mexico City, the Lerma River's phreatic level (the depth at which water is found) dropped at an astonishing rate, so quickly that if water continued to be drawn out at that rate the system would be depleted entirely.¹⁰ The answer: the Cutzamala River. The system pumps water from up to 154 km away, and up over 1000 m of elevation, for, at most, a meager rate of $9 \text{ m}^3 \text{ s}^{-1}$.¹¹ The cost of developing the Cutzamala system in the twentieth century came in at almost USD 956 million, and it costs an estimated USD 33,000 to pump just $1 \text{ m}^3 \text{ s}^{-1}$, an extremely high price tag. ¹² Unfortunately, this investment might not ever be successful as only 30 percent of the city's water comes from the reservoirs, an amount that some think is too low for the enormous amount of money

⁸ Keith Pezzoli, *Human Settlements and Planning for Ecological Sustainability: The Case of Mexico City* (Cambridge: The MIT Press), 136.

⁹ Tortajada and Castel6n, 125.

¹⁰ Simon, 528.

¹¹ Tortajada and Castel6n, 126.

¹² *Ibid.*, 127.

Water, Housing, and Transportation in Mexico City

the government spends to provide this water.¹³ In many cases, such as those of Lupe Gonzalez or citizens in Ciudad Neza, water sometimes does not even reach those in need and, at the end of the twentieth century, over 5 percent of Mexico City civilians had to purchase water from private water trucks at great personal expense.¹⁴ Creating reservoirs also leads to the displacement of rural workers and farmers so that the government can provide water to those in the MCMA. Although a cancelled fourth stage of the system brought an end to potential social conflicts, it is important to note that these social conflicts had almost no bearing on the cancellation of the project.¹⁵ Other factors, including cost and wastewater treatment, led to the cancellation, demonstrating that the government will do almost anything to provide basic services to the people of Mexico City while ignoring the pleas and outcries of those living in rural Mexico.

The Cutzamala system represents perfectly the problem that plagued the Mexico City government for the last five decades, a temporary solution for an omnipresent problem. The price it costs to pump water out of the depleted aquifers cannot be sustained forever. Not only does it cost more to pump from deeper levels, the water contains higher amounts of minerals, making it more expensive to clean and treat the ground water.¹⁶ In addition, the subsidence mentioned does more than just affect the buildings of the city. The entirety of the underground infrastructure, including subway tunnels, has been compromised. The subsidence of the city causes buildings' foundations to become compromised (allowing easier destruction during periodic earthquakes) with sinkholes erupting out of nowhere.¹⁷

Pumping water from the aquifers of the Valley of Mexico has a greater effect on the area than just cost to the city. As stated, the extreme subsidence of the land damaged the extensive underground infrastructure in Mexico City. One of the key components of the infrastructure damaged by the subsidence was wastewater and sewage. Not only has the pumping of water into the city affected the development of the city in the latter half of the twentieth century, the pumping out of wastewater has provided a tricky obstacle for those governing the city. Before the last century, the sewage system of Mexico City (known as the Grand Drainage Canal) used gravity to transport wastewater, as well as

¹³ Simon, 528.

¹⁴ Tortajada and Castelán, 124.

¹⁵ *Ibid.*, 126-127.

¹⁶ Simon, 521.

¹⁷ *Ibid.*

excess rainwater, out of the city.¹⁸ Unfortunately the subsidence caused by pumping has disrupted this natural flow. The government, forced into a corner, had no choice but to build pumping stations to help combat these issues. However, the increased population growth in the twentieth century has made the old sewage system insufficient.¹⁹ This population increase has also led to slower rates in treating wastewater. Even though the government has tried to increase the sewage infrastructure of the city, the population growth has proved to be too much for the drainage of the city. The subsidence makes any alterations to the system expensive because the government has to spend more to help negate the consequences of the sinking. Not only has the sewage system reached full capacity in the city, flooding became more likely in the city due to the Grand Drainage Canal and other drainage pipes losing effectiveness due to subsidence, and both rain and wastewater have flooded out onto the street on some occasions.²⁰

Throughout the end of the twentieth century, the unpreparedness of the city's government became apparent. Mexico City has a history of reacting instead of planning to combat predictable issues when they come to light. Times might be changing however. At the end of the twentieth century, the government identified a distant river system (Amacuzac River) that could potentially be the end of their water woes.²¹ If the government pursues this option, officials believe the Amacuzac River can permanently end the pumping from the Valley of Mexico aquifers, but only time will tell if the potential (and costly) investment can fix the massive water problem facing the city.

In the latter half of the twentieth century, Mexico City has had many problems with water, not just acquiring it, but also with treating wastewater and drainage. The problems associated with the water infrastructure of the city seem to revolve around the inaction of the government of the city. Too many times in its history, Mexico City had no choice but to react to large-scale problems instead of planning ahead and making sure the infrastructure of the city was strong enough to handle increases in population. When the population growth proved too much for the city and its suburbs, the government was forced to come up with costly solutions to problems that could have been solved using cheaper and easier means if they had been addressed earlier. Mexico City still faces many of the problems surrounding access to water today that it

¹⁸ Tortajada and Castelán, 128.

¹⁹ Ibid.

²⁰ Ibid.

²¹ Ibid., 127.

Water, Housing, and Transportation in Mexico City

faced in the twentieth century. Without proper planning, the city government can only hope for the best when the infrastructure breaks down under the pressures of water needs.

Housing

During the postwar boom in the Mexican economy, Mexicans flooded into their nation's capital at astronomical rates. The population of the metropolitan area had a 424 percent increase in thirty years, from 1,758,000 residents in 1940 to about 9,211,000 residents in 1970.²² The lack of housing, which stemmed from former Mexican presidents' indifference about the subject, caused the Mexican government to spend most of its funds on new housing projects when the city became overwhelmed by Mexicans looking for jobs.²³ This forced the government in the late forties and early fifties to create even more government agencies to deal with the problem of housing in the city. In 1964 the Financial Program for Housing (PFV) tried to channel both public and private funds to help boost construction in the housing market.²⁴

Despite the government's earlier efforts, by 1970, the metropolitan area faced a major housing deficit of almost 577,000 units.²⁵ In the 1970s, two agencies, the National Funding Institute for Workers' Housing and the Workers' Housing Fund for State Employees (INFONAVIT and FOVISSSTE), provided low cost mortgages for private and public sector employees, respectively, and this saw the alleviation of some housing pressures.²⁶ However, for many citizens in the MCMA, these agencies did not alleviate the problem because the issues in housing did not affect those employed in the public and private section as much as those who worked in the informal sector of the economy. In 1974, almost 40 percent of those living in the Mexico City metropolitan area identified as informal workers (unemployed and underemployed) who did not have access to low-cost mortgages and thus had no answers to their housing woes.²⁷ Because nearly 55 percent of those living in the metropolitan area could

²² Diane E. Davis, *Urban Leviathan: Mexico City in the Twentieth Century* (Philadelphia: Temple University Press, 1994), 329.

²³ *Ibid.*, 117-118. PFV stands for *Programa Financiero de Vivienda* in Spanish.

²⁴ Kathryn Stephens-Rioja, "Land and Shelter: Important Issues for a Growing Metropolis," in "Housing Alternatives: Third World," special issue of *Built Environment* 8, no. 2 (1982): 110.

²⁵ *Ibid.*

²⁶ *Ibid.* INFONAVIT and FOVISSSTE stand for *El Instituto del Fondo Nacional de la Vivienda para los Trabajadores* and *Fondo de Vivienda para los Trabajadores de Estado* respectively.

²⁷ *Ibid.*, 111.

not afford even the cheapest housing in the city, many of those unable to gain access to low-cost housing simply built their own places of shelter.

In the oldest parts of the city, inner-city slums called *vecindades* arose where older rental property became available. Existing since the 1940s and subject to rent control, these highly crowded rental units had a population of about two million in 1970.²⁸ Despite their state of dilapidation and the overcrowded units, the low rent and proximity to the center of the city made them desirable as living spaces for low-income residents. In the second half of the twentieth century, one of these *vecindades* occupants was Lupe Gonzalez, the Mexico City resident mentioned earlier. Crammed into a single-room dwelling with her husband and six of their children, Lupe dreamed of escaping into new housing.²⁹ Lupe's daily struggles represent millions of other Mexican citizens living in the *vecindades*. Like Lupe, many people hope to move out to new government housing at the edge of the sprawl of the city, but unfortunately the Mexican government has not been able to keep up with the housing demand.

On these outer edges, new kinds of shantytowns popped up, providing a fresh set of problems for the Mexican government. Even if they live in a crowded dwelling, at least those in the *vecindades* have stable roofs above their heads. Many low-income citizens come home every day to urban slums known as *ciudades perdidas*. Because these slums develop in abandoned urban lots, many residents construct their own homes. These residents make up five percent of the metropolitan area's population (about 300,000 in 1982) and face daily risks of the destruction of their homes to make room for urban renewal projects.³⁰

Decrepit housing situations much like the *vecindades* and *ciudades perdidas* also exist outside of the city limits. With no room to cram into the *vecindades* and no money to afford the government housing, many Mexicans took to the salt flats east of the city and founded cities and towns known as *colonias proleterias*, which grew exponentially.³¹ The largest and most infamous of these slums, Ciudad Neza, grew from a few thousand residents in the 1950s to over one million citizens in the 1980s. Throughout the twentieth century, Ciudad Neza consistently ranked first as the poorest and most crime-ridden slum in the metropolitan area. Described by writer Roberto Vallarino, Ciudad Neza "is a vision of the

²⁸ Ibid., 112.

²⁹ Hellman, 246-247.

³⁰ Stephens-Rioja, 112-113.

³¹ Ibid., 113.

Water, Housing, and Transportation in Mexico City

apocalypse” and smells “rotten.”³² Despite the fact that wealthier citizens consider Mexico City as an apex of culture and economic activity, Vallarino criticizes the slums of Mexico City as a “burning, maddening, spasmodic, and terrible stain” that represents the negative side of the rapid development of Mexico City during this time.³³ By the end of the twentieth century, Ciudad Neza had become cleaner with an improved infrastructure, but it still has a long way to go before getting rid of its past ghosts.

But how do places like Ciudad Neza come into creation? How could the government not predict the population boom and successfully deal with it? Again, in most cases of infrastructural woes, the government simply does not make long term developmental plans, and when faced with a growing problem, tries their hardest to erase the problem, no matter the cost. This seemed to be a reoccurring trend during this period and the government has yet to develop policies based on efficient planning instead of reactive policies. However, this does not solve the question of how outer slums and *colonias proletarias* develop. Most people who call these slums home acquired the land through informal housing markets.³⁴ In 1978, almost 60 percent of the metropolitan area called these settlements home, but the communities popped up so fast that authorities were unable to establish proper infrastructure and millions of people grew up in cities without proper water, sewage, or electricity.³⁵ However, in the 1960s, a payment strike against developers for their failure to provide basic infrastructure pushed the usually indifferent government to action.³⁶ In order to develop an infrastructure for these shanty towns, the government needed to legalize the deeds acquired from informal markets. To help speed up the process, the Mexican government created two agencies, the Regulation Commission for Land Tenure (CORETT) and the Social Interest Trust for the Urban Development of Mexico City (FIDEURBE).³⁷ These two agencies started the process of legalizing deeds so that new citizens of the area could properly own houses, a process that took up to a decade. In that span of almost a decade, CORETT successfully legalized almost 40 percent of the illegally settled land, but

³² Roberto Vallarino, “Ciudad Nezahualcóyotl: Souls on the Run,” in *The Mexico Reader*, ed. Gilbert M. Joseph and Timothy J. Henderson (Durham: Duke University Press, 2002), 537.

³³ Vallarino, 544.

³⁴ Stephens-Rioja, 111.

³⁵ *Ibid.*, 114.

³⁶ *Ibid.*

³⁷ *Ibid.* CORETT and FIDEURBE *Comisión para la Regulaización de la Tenencia de la Tierra* and *Fideicomiso de Interés Social para el Desarrollo Urbano de la Ciudad de México* respectively.

almost all of this activity took place in Mexico City proper, as opposed to the State of Mexico, where almost all of the growth has taken place.³⁸ Once the land is legally obtained, the area can be incorporated, an official government can then be organized, and a proper infrastructure becomes established in the area, providing basic needs to thousands.

Although the creation of legal deeds benefited those who settled on illegally acquired land, this massive population growth affected a long-time government-backed idea, the social right to land. As stated, informal (i.e. illegal) housing markets popped up to help give thousands of rural migrants the ability to build a house, but what made these housing markets illegal?³⁹ Much of the land distributed in the informal housing markets originated from *ejido* land. Defined as communal land for agricultural purposes in the constitution of 1917, *ejidos* imply that the right to own land is a social right. After the ratification of the Constitution of 1917, over 24,000 *ejidos* formed, including many close to the capital, Mexico City.⁴⁰ Since the government recognizes *ejidos* as a social right, members of an *ejido* cannot sell, rent or mortgage the land, and are obligated to farm on it. People with *ejidos* could not ever lose or give them away. However, the illegal housing markets changed this. In the second half of the twentieth century, land illegally acquired by migrants came from *ejidos*. When the government created the two agencies that dealt with legalizing land, they compensated the *ejidatarios* with money, but left them without land. This process gave land to citizens in Mexico City, rich or poor, but stripped the unalienable right to land from those that do not call Mexico City (or the shantytowns that popped up in their land) home. Through land legalization programs, over four-fifths of the *ejido* land taken over by the government has been used for private development, whether housing or industrial parks, leaving only one-fifth for public or communal works, contradicting the Constitution of 1917.⁴¹ While some *ejidatarios* may have initiated the selling of their land to better benefit people (or so they claim) in an area with little agricultural purpose, the privatization of that land has done more to serve select individuals rather than society. Expropriation of *ejido* lands remains legal as long as the land serves a societal purpose and the *ejidatarios* receive compensation.⁴² The *ejidatarios* may be receiving compensation, but the newly expropriated land does not go towards public works, thus ignoring a large aspect of

³⁸ Ibid.

³⁹ Pezzoli, 3.

⁴⁰ Ann Varley, "Urbanization and Agrarian Law: the Case of Mexico City," *Bulletin of Latin American Research* 4, no. 1 (1985): 2.

⁴¹ Ibid., 5.

⁴² Ibid., 6.

Water, Housing, and Transportation in Mexico City

the Constitution of 1917 the government swore to protect.

This process is similar to how the government treats the acquisition of water. In order to please those who live in Mexico City and its suburbs, the government ignores the issues and needs of those in rural areas. Once again, Mexico faced pressing issues with their infrastructure and land use, and instead of developing long term programs, they created two costly agencies that stripped the legal right of land from those with *ejidos* to those who had illegally settled on communal land, ignoring their own Constitution to appease the citizens of Mexico City.

The shantytowns formed from illegal land markets affect much more than social rights; they also affect the ecology of the area. Unchecked urban sprawl has had quite a negative effect on the Mexico City Metropolitan Area and the ecological areas surrounding the city. Numerous ecological parks surround Mexico City and, for many years, the areas were protected from urban development. Then, when the population surged in the second half of the twentieth century, many people moved into areas originally declared as ecological reserves, and though the government attempted to prevent such actions with legislation, it ultimately failed.⁴³

In a case study highlighting the ecological effect of development near the volcano Ajusco, Keith Pezzoli highlights the dangers of unchecked incursion into these ecological reserves. Much of the area around Ajusco, once dedicated to farming and livestock, transitioned from rural lands to urban sprawl, in ways previously noted (irregular markets, *ejido* sales, and others).⁴⁴ Like many areas in the Mexico City Metropolitan Area, the settlements developed so quickly and illegally that the government could not create an infrastructure and many people in this area during the 1980s had no access to running water, requiring water trucks to come every week. Despite the government's best efforts to preserve ecological areas, both squalid shantytowns and upper-class residents pushed into the ecological reserves, forcing the government to move the ecological line farther and farther back.⁴⁵ But what does this demonstrate? If anything, it proves yet again that the government of Mexico finds temporary solutions to growing problems. As we know, pushing into the ecological reserves has affected the amount of groundwater available for use yet the government still has not come up with a solid way of preventing these developments. The urban sprawl has grown so great that it threatens to affect the protected environment.

⁴³ Pezzoli, 343-345.

⁴⁴ *Ibid.*, 17-18.

⁴⁵ *Ibid.*, 20.

Can Mexico recover from a potential ecological disaster if their entire natural environment is eaten up by urbanization? Can Mexico learn from its mistakes of the twentieth century to better prepare for the future?

Transportation

The influx of people to the capital city meant more than just strains on housing and water supplies. With many settlements cropping up on the outskirts of the Federal District, the many workers who lived outside the city but worked inside needed a way to get to work. Since most of the industry and jobs occur in the DF, commuting into the city is a necessity for a majority of residents. In 1988, civilians in the Mexico City Metropolitan Area took almost 20 million trips per day, and that does not even include walking trips.⁴⁶ For those commuting into the city from suburbs, the rate of automobile usage was significantly higher because of the lack of transportation infrastructure. This high usage of automobiles in the last decades of the twentieth century put an immense unprecedented strain on the road network. In the 1970s and the 1980s, it could take up to two and a half hours to travel roughly 14 miles from a suburb to Mexico City.⁴⁷ While during the weekdays Mexico City experiences massive amounts of congestion in both private and public transportation networks, the vast majority of the city's residents stay home during the weekends, in an effort to find relief from the urban monster that is the city.⁴⁸

Besides the heavy traffic, the roads themselves proved inadequate. In the rural areas east of the city, the lack of proper roads created isolated towns and in areas to the west and southwest, valleys and ravines make peripheral transportation impossible, forcing people to travel into the city center when it is not necessary for them to do so.⁴⁹ Bad traffic plagues the city, not only because of the topographic issues, but because of the inadequate highways in the area.⁵⁰ While most people who work in Mexico City live outside the city, the road network in the DF proved to be more advanced than the roads in communities in the state of Mexico. The Federal District has 9,500 km of roadways as opposed to the significantly

⁴⁶ Angel Molinero, "Mexico City Metropolitan Area Case Study," in "Transport in World Cities," special issue of *Built Environment* 17, no. 2 (1991): 128.

⁴⁷ Ricardo Garibay, "Voyage to the Center of the City," in *The Mexico City Reader*, ed. Rubén Gallo (Madison: University of Wisconsin Press, 2004): 134.

⁴⁸ Néstor García Canclini, *Consumers and Citizens: Globalization and Multicultural Conflicts* (Minneapolis: University of Minnesota Press, 2001), 52.

⁴⁹ Molinero, 130.

⁵⁰ *Ibid.*, 131.

Water, Housing, and Transportation in Mexico City

less 1,182.3 km of roadways outside the city in the metropolitan area.⁵¹

As most growth in the area occurred out of the city proper, fewer roads and less public transportation increase the traffic on the highways to astronomically high levels. While completed grid networks of major highways helped alleviate the congestion in the eastern parts of the metropolitan area, the incomplete orbital rings in the metropolitan areas did nothing to help the traffic issues.⁵² The *ejes viales*, or axis roads, put into play during the presidency of José López Portillo, tried to soften traffic congestion by providing one-way travel in east to west and north to south directions (and vice-versa), but in 1991 only 287 km of the planned 537 km had been completed, and have yet to be completed today.⁵³

Throughout the second half of the twentieth century, road construction and infrastructure improvement helped the congestion but the unrivaled growth of the metropolitan area proved too much for the transportation infrastructure. During this time, almost 2.5 million automobiles traveled the streets of the metropolitan area, due to the cheaper production cost of cars in the 1950s and 1960s and the consequent increase in individual car ownership. However, in later decades the cost became too high in relation to income and the rates of automobile ownership dropped.⁵⁴

For those unable to afford their own car, public transportation serves as the only way to get to work. Unfortunately for many, the infrastructure of public transportation in both Mexico City and cities surrounding the capital in the state of Mexico dealt with inadequacies during the twentieth century. Before the introduction of the metro in 1969, bus travel accommodated about 81 percent of total passenger traffic, a number that significantly lessened as the decades passed, to only 43 percent of total passenger traffic in 1983.⁵⁵ Many issues for bus travel in the metropolitan area include the lack of cohesiveness between DF and the state of Mexico in establishing a joint transportation authority. The creation of numerous private transportation authorities throughout the metropolitan area led to buses cluttering up the streets. These small companies also lacked the proper management and maintenance to make them fiscally successful.⁵⁶ Even the medium to large size bus companies have issues with maintenance and fixed infrastructure. All public bus

⁵¹ Ibid.

⁵² Ibid.

⁵³ Ibid.

⁵⁴ Ibid., 132.

⁵⁵ Ibid.

⁵⁶ Ibid., 126.

companies receive grants from either DF, the state of Mexico, or the federal government, but those private companies (usually the smallest ones) do not receive any money from the government and thus lose money, provide a poor level of service, and therefore isolate the cities served from the broader public transportation infrastructure.⁵⁷

In 1981, the government founded R100, the public bus system for Mexico City, after authorities determined that nineteen private companies lacked adequate service. These companies were absorbed into a public entity. However, only 25 percent of the 6,345 buses were operable and the garages had inadequate facilities, with only one in three buses in 1991 in adequate condition for servicing.⁵⁸ Trolleybuses in the cities had the same issues with respect to cost and reliability. Poor management and service led to the outdated and inefficiency of the fleet, no preventative maintenance occurred, and only 72 percent of needed corrective maintenance on the fleet was performed in the 1990s.⁵⁹ The inadequacies of the public buses led to the increase in taxi use as well as once illegal *colectivos*, commonly manifested as minibuses. The ubiquitousness of these minibuses led to an increase in use, up to seven million trips in 1991 from two million in 1983, and although overcrowding occurs, minibuses proved to be one of the most viable options for Mexico City civilians.⁶⁰

Most of these bus and minibus companies were located solely in the DF. What about bus systems in the suburban areas? The seventy companies (sixty-five private and five state-owned) provide much needed, but uncomfortable, transport from the suburban and satellite cities to metro stops, which subsequently provide additional transportation services into the city center.⁶¹ Poor infrastructure and maintenance led to the rapid deterioration of the infrastructure of the cheaper, private bus companies and most people used the forty-one R100 routes that served the suburbs.⁶² These suburban buses exist to shuttle people from the satellite communities to outlying metro stations and DF bus depots, thus creating an extensive and confusing interchange and an even longer and more painful commute.

A subway was first formally proposed for Mexico City in 1960, though ideas for an underground transportation system, quickly discarded due to the huge projected costs, had been tossed around as

⁵⁷ Ibid.

⁵⁸ Ibid., 134.

⁵⁹ Ibid., 135.

⁶⁰ Ibid.

⁶¹ Ibid., 136.

⁶² Ibid., 135.

Water, Housing, and Transportation in Mexico City

early as 1952.⁶³ In the 1960s, a subway seemed to be the only way to alleviate the transportation woes that came from the massive migration of Mexicans from the countryside to Mexico City. However, Mayor Uruchurto kept the idea off the table as he feared for his popularity among bus owners and members of the middle-class if a metro developed in the city.⁶⁴ Despite worries about the enormous cost of the system, the developing transportation woes proved too great for Mexico's president and government to ignore this option.⁶⁵ Thus, in 1969, the first major public works project initiated after the student massacre in Tlateloco (a move critiqued by some writers as a way to replace lost freedoms that disappeared after the tragic shooting), the metro of Mexico City, opened with one line that served sixteen stations.⁶⁶ Throughout the end of the twentieth century, the metro system grew to encompass twelve lines and 195 stations.

In no time at all, the metro (officially the *Sistema de Transporte Colectivo*) became a major thoroughfare for riders of public transportation and up to five million people squeeze in to ride the subway every day.⁶⁷ In 1991, the metro accounted for 15 percent of all passenger trips in the MCMA and 76 percent of all metro trips occurred on only three lines.⁶⁸ Despite serving so many stations, the metro has proven inadequate for transporting the masses into the city center. As noted above, the suburban buses serve to transport people from satellite communities to the metro stations, before continuing their commute into the city. This uncoordinated and unplanned transfer system between separate transit authorities leads to prolonged waits at interchanges. Even in the city center, gaining access to the trains proves difficult. Firsthand accounts have described the pure madness that erupts due to the twenty-second struggles to get onto each train, a massive amount of "pushing, shoving, trampling, and stampeding," which repeats itself every time a new train arrives in the station.⁶⁹ In 1991, it could take up to twenty minutes to board a train at an interchange, a painful, superfluous step on an already

⁶³ Davis, 147-150.

⁶⁴ *Ibid.*, 159.

⁶⁵ *Ibid.*, 203-204.

⁶⁶ Juan Villoro "The Metro," in *The Mexico City Reader*, ed. Rubén Gallo (Madison: University of Wisconsin Press, 2004), 130. The massacre at Tlateloco occurred on October 2, 1968 when police and military forces opened fire on a group of students that were protesting the oppressive regime of Mexico's dominant political party, the *Partido Revolucionario Institucional (PRI)*.

⁶⁷ Carlos Monsiváis "The Metro: A Voyage to the End of the Squeeze," in *The Mexico City Reader*, ed. Rubén Gallo (Madison: University of Wisconsin Press, 2004), 143.

⁶⁸ Molinero, 132.

⁶⁹ Garibay, 135.

long commute.⁷⁰

Not only did the metro of Mexico City provide a new way to travel around the city, alleviating the pressures faced by the road network, the system provided a new means of social commentary on the development of Mexico City. Although not presented on the map of the metro, each station has a unique icon that serves as an identifier for the stop. These icons usually depict pre-Columbian images to show not only that the government respects and acknowledges the existence of the culture, but to help identify stops for those riders who are illiterate.⁷¹ This commentary demonstrates that despite the desire of the government to highlight Mexico City as a center and leader in developing nations, the development of this urban area exacerbated the negative aspects of urban growth as well: the massive and disproportionate rise of lower-income workers and neighborhoods. These negative aspects weigh heavily on the metro system, affecting any attempts to make stations like Metro Insurgentes, one of the busiest stations in the system, into centers of culture. Instead these stations simply become more plazas amidst the overpopulation and poverty, with efforts for improvement going unnoticed.⁷² These issues of overpopulation in the city cause commuters who must face the metro and other modes of transportation to block out the tumult and noise of the city during their travel, whether to work or for recreational purposes, leaving those public works installed to boost the city's culture unnoticed and unappreciated in the background.⁷³

Not only did the transportation infrastructure (especially the metro) lack an effective reach into all areas of the metropolitan area, the spending on and subsidies for all types of public transportation commandeered an abnormally large portion of the city's budget throughout the latter half of the twentieth century. The increase in public transportation in this period also saw an increase of spending in this area. In a short five-year span in the 1980s, the budget percentage for transportation and associated areas for Mexico City jumped from roughly 33 percent to an incredible 77.8 percent.⁷⁴ For the metropolitan area surrounding the DF, the budget for transportation in the state of Mexico was significantly lower for a much larger area, yet again demonstrating the lack of infrastructure caused by the rise of large shanty towns founded by recent immigrants to the city. To make matters worse, public

⁷⁰ Molinero, 130.

⁷¹ Villoro, 130.

⁷² José Joaquín Blanco, "Metro Insurgentes," in *The Mexico City Reader*, ed. Rubén Gallo (Madison: University of Wisconsin Press, 2004), 140.

⁷³ Canclini, 52-53.

⁷⁴ Molinero, 127.

Water, Housing, and Transportation in Mexico City

transportation fares did not cover the operating costs and much of the transportation budget accounts for subsidies.⁷⁵

But why subsidize so much? Of course, many transport authorities receive subsidies from governments to keep their transportation services running, but the amount of money spent by the Mexico City government on subsidies, especially the metro, perplexes many. This trend started in the second half of the twentieth century and has yet to stop. In 2008, almost 82 percent of the transportation budget covered metro subsidies, a mode of transportation that accounted for a modal share of only 13.4 per cent, a number that has not wavered since the mid-1980s.⁷⁶ Many of the new immigrants to Mexico City in this period came from low-income families and could not afford expensive tickets, and those that could afford a different means could potentially opt out of an expensive and crowded means of transportation if their private automobile made the commute cheaper.⁷⁷ While this reasoning appeared to be why the fares were kept at a low price, it may not be the actual reason. Studies suggest that the metro remains the best mode of travel in the areas that it serves. The metro lacks the traffic and congestion that automobiles and buses have to deal with, and remains the cheapest and fastest way to travel across the city, as bus fares rise with increasing distance to cover.⁷⁸ An intensive study from Rutgers has suggested that those who ride the metro have no better alternative and those that do not ride it simply do not want to. The study showed that as soon as an individual's income levels rises, they become less likely to ride the metro or public transportation, suggesting that many see the metro as a transportation mode for those that cannot afford better.⁷⁹ In fact, no correlation exists between public and private transportation as substitutes for each other and perhaps those that can afford private transportation simply choose to avoid the discomfort of the cramped trains of the metro during rush hour despite the longer commute that comes with car travel.

The possibility remains that, the actual reasons that metro ridership accounts for a low portion of modal shares have nothing to do with the ability to drive private automobiles. In such case, maps provide clearer perspectives when examining these tough questions. The map that highlights the metro rail network in relation to the size of the Mexico City

⁷⁵ Ibid., 126.

⁷⁶ Amado Crotte, Daniel J. Graham, and Robert B. Noland, "The Role of Metro Fares, Income, Metro Quality of Service and Fuel Prices for Sustainable Transportation in Mexico City," *International Journal of Sustainable Transportation* 5 (2011): 2.

⁷⁷ Ibid.

⁷⁸ Ibid., 20.

⁷⁹ Ibid., 19.

Metropolitan Area highlights the inefficacies of the system. The infrastructure of the metro systems shares only a 1.7 equivalency to the road network of the city, which demonstrates why such a small percentage of Mexico City commuters use the system.⁸⁰ Other modes of transportation, private or public, may be less convenient and slower than the metro but the metro only serves a small percentage of all that live in the area. If the metro's quality of service improved, perhaps more people would ride it.⁸¹ Mexico City keeps the fares abnormally low, so low that it costs almost nothing to ride the system, but still the rate of use has not risen since the 1980s. If Mexico City wants to increase the number of riders, the government needs to do more than simply lower the fares.

Despite pouring a vast majority of their city budget into transportation, the city's transportation systems remain weak and outdated. Similar to its efforts in acquiring water, the government of Mexico City seems to care very little about planning and cost. The population growth in this metropolitan area has overwhelmed the transportation infrastructure of the city with respect to both public and private transportation. If Mexico continues to shell out massive amounts of money for temporary solutions to solve major problems, the government might find itself in a serious predicament when they finally find a permanent solution but have no way to finance it.

Carlos Monsiváis summed up perfectly the attitudes of those living in Mexico City during this period. While the crime, pollution, and overcrowded streets have made citizens desire to leave the city, many have an optimism that the worst is over; they feel that Mexico City will continue to survive indefinitely in its inexplicable way and the city will continue to represent Latin American modernity.⁸² Monsiváis also argued that the cramped quarters create a biblical metaphor of inclusiveness for all walks of life; in the metro, "there is room for everyone" and the boundaries between different citizens cease to exist, creating a unity between people.⁸³ Unfortunately, this optimism about the city's future could be short-lived. During the last half of the twentieth century, Mexico City and its suburbs experienced a massive amount of growth that proved too much for the old infrastructure. The urban development that followed this growth seemed to play catch up rather than handling the pressures of this population spike. For too long, Mexico City and its

⁸⁰ Ibid., 21.

⁸¹ Ibid., 20.

⁸² Carlos Monsiváis, "Identity Hour, or What Photos Would you Take of the Endless City?" in *Mexican Postcards*, trans. John Kraniauskas (New York: Verso Publishing, 1997), 34-35.

⁸³ Ibid., 145.

Water, Housing, and Transportation in Mexico City

government have created temporary (and costly) solutions to problems that need more than just a superficial bandage. If this research has shown anything, it proves the necessity for Mexico City to develop a long term and planned-out solution for their water, housing, and transportation needs. If not, the problems this city encounters in the near future may be too large for anyone to handle, and the optimism Mosiváis describes with respect to Mexico City's continued existence will truly be unwarranted.

Reed Battles is a first-year MA student hailing from Fort Worth, Texas. He received a BA in history from Texas Christian University where he also minored in Spanish. His research interests include modern Mexican history, specifically the urban history of Mexico City in the twentieth century. More specifically he is interested in the gay urban history of Mexico City in respect to the history of public transportation, and he wants to examine the relationship between tolerance and shared spaces. Outside of history he is interested in traveling, reading (he loves a good memoir), exercising, and is an avid connoisseur of both tacos and pop culture.

Bibliography

Primary Sources

Blanco, José Joaquín. "Metro Insurgentes." In *The Mexico City Reader*, edited by Rubén Gallo, 139-142. Madison: University of Wisconsin Press, 2004.

Garibay, Ricardo. "Voyage to the Center of the City." In *The Mexico City Reader*, edited by Rubén Gallo, 133-138. Madison: University of Wisconsin Press, 2004.

Hellman, Judith Adler. "Survival in the Shantytown." In *Mexico Otherwise: Modern Mexico in the Eyes of Foreign Observers*, edited by Jürgen Buchenau, 241-249. Albuquerque: University of New Mexico Press, 2005.

Monsiváis, Carlos. "Identity Hour or, What Photos Would you Take of the Endless City?" In *Mexican Postcards*. Translated by John Kraniauskas, 31-35. New York: Verso Publishing, 1997.

——— "The Metro: Voyage to the End of the Squeez." In *The Mexico City Reader*, edited by Rubén Gallo, 143-145. Madison: University of Wisconsin Press, 2004.

Vallarino, Roberto. "Ciudad Nezahualcóyotl: Souls on the Run." In *The Mexico Reader*, edited by Gilbert M. Joseph and Timothy J. Henderson, 536-544. Durham: Duke University Press, 2002.

Villoro, Juan. "The Metro." In *The Mexico City Reader*, edited by Rubén Gallo, 123-132. Madison: University of Wisconsin Press, 2004.

Secondary Sources

Canclini, Néstor García. *Consumers and Citizens: Globalization and Multicultural Conflicts*. Minneapolis: University of Minnesota Press, 2001.

Crotte, Amado, Daniel J. Graham, and Robert B. Noland. "The Role of Metro Fares, Income, Metro Quality of Service and Fuel Prices for Sustainable Transportation in Mexico City." *International Journal of Sustainable Transportation* 5, no. 1 (Jan. 2011): 1-24.

Water, Housing, and Transportation in Mexico City

- Davis, Diane E. *Urban Leviathan: Mexico City in the Twentieth Century*. Philadelphia: Temple University Press, 1994.
- Molinero, Angel. "Mexico City Metropolitan Area Case Study." In "Transport in World Cities," Special issue of *Built Environment* 17, no. 2 (1991): 122-137.
- Pezzoli, Keith. *Human Settlements and Planning for Ecological Sustainability: The Case of Mexico City*. Cambridge: The MIT Press, 1997.
- Stephens-Rioja, Kathryn. "Land and Shelter: Important Issues for a Growing Metropolis." In "Housing Alternatives: Third World." Special issue of *Built Environment* 8, no. 2 (1982): 108-116.
- Simon, Joel. "The Sinking City." In *The Mexico Reader*, edited by Gilbert M. Joseph and Timothy J. Henderson, 520-535. Durham: Duke University Press, 2002.
- Tortajada, Cecilia and Enrique Castelán. "Water Management for a Megacity: Mexico City Metropolitan Area." *Ambio* 32, no. 2 (Mar. 2003): 124-129.
- Varley, Ann. "Urbanization and Agrarian Law: The Case of Mexico City." *Bulletin of Latin American Research* 4, no. 1 (1985): 1-16.