GOOD NEIGHBOR ENVIRONMENTAL BOARD

Presidential advisory committee on environmental and infrastructure issues along the U.S. border with Mexico

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December 13, 2024

President Joseph Biden
The White House
1600 Pennsylvania Avenue
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Dear Mr. President:

As your federal advisory committee for environmental and infrastructure issues along the U.S. border with Mexico, the members who will develop the 21st Good Neighbor Environmental Board (GNEB) annual report are working on a series of four short comment letters focused on priority environmental infrastructure topics in the U.S.–Mexico border region. The goal is to illustrate case studies and examples that convey the urgency for a renewed commitment toward increased investment in the border region in the context of the 40th anniversary of the La Paz Agreement. The four letters will be written over 18 months with a focused outreach campaign to ensure community engagement, inclusion, and individual voices are part of GNEB's work. At the end of the 18 months, the four letters will be combined to provide a comprehensive overview of border environmental needs from a wide public and private-sector perspective.

The U.S.–Mexico border region, stretching nearly 2,000 miles, is home to a diverse range of communities, with both common and unique challenges related to drinking water access, as recently explored by GNEB (2023) in its 20th report, *Water and Wastewater in the U.S.–Mexico Border Region*. Water availability is central to the livelihoods and well-being of border communities from Brownsville and Matamoros to San Diego and Tijuana (Mumme 2021).

Regional growth dynamics and changing patterns of water availability are altering the region's water security and institutional arrangements (Mumme 2021). As described by the Board's 2016 and 2023 reports, the U.S. border region faces rapid economic and population growth; fast-paced urbanization contrasting with vast rural areas and small and spread-out communities; shared natural resources, such as rivers and groundwater; economic, cultural, and political differences and asymmetries with Mexican communities across the border; burgeoning international commerce and trade flows; high rates of poverty; diverse ethnic identities; and record heat and severe storms that the southwestern United States has experienced in recent times (GNEB 2016, 2023).

This first letter focuses on challenges to drinking water availability and potential technological solutions to improve access and resilience in underserved and unconnected communities in the border region. The goals are to identify the role of new technologies to aid in the interim of using tried-and-true technology to connect populations to quality water sources and to help communities and individuals evaluate their access to clean drinking water. Water diversification is seen as a necessity in the region to enhance the potable water portfolio. Therefore, this comment letter is an essential summary of what we know about the challenges to accessing drinking water in the region, the limited conditions in which new technologies make the most pragmatic sense, and the precautionary reasons to not abandon regional extension and conservation efforts.

Currently, new technologies to provide water access are at various levels of development in the region. Consequently, this letter's appendix describes two case studies that showcase the application of one new technology that may provide drinking water to populations that need a temporary supply following a natural disaster, that need connections while waiting for public services to be brought to their area, or that are so isolated or remote that no plan currently exists for regional connection. These situations are limited, but new strategies are needed for the expansion of water use and reuse for community members to survive along the border region.

Current Options to Provide Safe Potable Water to Remote Communities

Novel technologies may hold promise for providing water to remote communities, but a variety of more traditional options are available that may require only additional funding and commitment. Small water systems, in particular, face complex governance issues that complicate their design, implementation, maintenance, and operations (McFarlane and Harris 2018). GNEB proposes to examine alternative options to provide potable water to remote households, including a developing a portfolio of options (Table 1) and determining where and when those options are most viable and what regulatory, geographic, and economic barriers prevent implementation of each option.

Table 1. Portfolio of Water Supply Options for Municipal Supply (McFarlane and Harris 2018, authors' analysis)

Option	Advantages	Disadvantages	Medium-to-large systems	Small systems
Trucked-in water	Widely used, flexible	Health impacts, reliability, expensive		X
Rainwater harvesting	Low cost, decentralized	Variable reliability, treatment, water quality testing, limited scale		X
Desiccation technologies	Solar-powered, decentralized	Expensive ($0.50/gallon), maintenance issues, water quality testing, training/ workforce development		X
Agriculture to urban transfer	Low cost, potential mutual benefit	Controversial, legal restrictions, water scarcity, need find and use an existing distribution network	X	
Groundwater	Widely used, potentially decentralized	Limited potential in some areas, potential for contamination	X	X
Desalination	In use, technology improving	High energy cost, waste disposal	X	X
Surface water provision	Potentially low cost if infrastructure present	Limited in areas without piped distribution	X	

Portfolio of Technologies That Could Support Drinking Water Access

Innovative water desiccation technologies can be placed in three categories:

1. Solar stills and evaporation technologies.
   a. Method: old technology—has been around for thousands of years, with modern variations.
   b. The basics of the technology are described by Jackson and Van Bavel (1965).
   c. Pluses: simple, reliable, lower energy requirement.
   d. Minuses: lower water-volume productivity.
2. Cooling and condensation technologies.
   a. Method: well-established and modernized technology.
      i. The Skywater® adiabatic distillation process (e.g., Skywater atmospheric water generator).
      ii. The American Society of Mechanical Engineers provides a review of six different atmospheric water generators and notes that water production rates are based on humidity and air temperature (Crawford 2022). The technologies reviewed in this article include solar-powered hydropanels; gel-film material that functions in lower humidity environments; zeolite, which works with relative humidity as low as 20 percent, being developed by Massachusetts Institute of Technology scientists; clustered carbon-based nanorods that absorb water in low-humidity environments from Pacific Northwest National Laboratories researchers; wood-to-energy deployable water, which can generate 2,000 or more liters of water from organic trash; and Fontus Airo, a small water bottle that is solar powered and can refill in less than an hour.
   b. Pluses: few moving parts, adaptable to mobile energy sources.
   c. Minuses: relatively high energy costs, though GNEB is unable to make direct comparisons to other options.
3. Metal–organic framework desiccation water harvesting.
   a. Method: early solar still and desalination research leads to research on a variety of metal–organic frameworks.
      i. Academic research supports the implementation of this technology.
      ii. Siddiqui et al. (2023) provide an extensive review of the technology.
      iii. Chemistry Europe supports the implementation of this technology with a review of how the different technologies function (Harrer 2022).
      iv. Through the Defense Advanced Research Projects Agency, the U.S. Department of Defense funded General Electric with $14 million to conduct research on the technology (Tucker 2021).
   b. SOURCE®, a private-sector firm located in Arizona, offers a package of metal–organic framework technologies.
   c. Optimum Green Ventures and Cascadia Technologies have developed the Mai Sabeel Project. They estimate that the cost to manufacture a 240 liter-per-day system purchased in 1,000+ unit annual quantities will be less than $24,000. In terms of projected operating cost, Mai Sabeel off-grid systems incur zero energy cost—and therefore produce zero emissions—because they are solar-powered. Maintenance costs are estimated at less than $100 per 100,000 liters (Mai Sabeel 2024).
   d. Pluses: academic research confirms the science involved, commercial products are available.
   e. Minuses: Costs appear to be very high for large-scale implementation, may see an energy–water tradeoff.

Geography and urban development are important aspects of the implementation of new technologies for clean drinking water access. The following section examines the different border geographies and analyzes the different water technologies available.

Possibilities for Drinking Water Access in Border Communities

This section provides a brief overview of the drinking water access issues experienced by different sizes of communities along the border, ranging from (1) large cities and binational metropolises; (2) small, tribal, and rural areas; and (3) *colonias*. In addition, the Board explores cross-sectional vulnerabilities resulting from (1) climate change and extreme weather events; (2) trade, industrialization, and infrastructure constraints; and (3) the complexities of binational governance and unreliability of water deliveries.

Large Cities and Binational Metropolitan Areas

Binational metropolitan areas along the U.S.–Mexico border (such as San Diego–Tijuana, El Paso–Doña Ana–Ciudad Juárez, Laredo–Nuevo Laredo, McAllen–Reynosa, and Brownsville–Matamoros) face significant water management challenges driven by rapid population growth, urbanization, industrial expansion, agricultural water use, and trade. The increasing demand from expanding populations places immense pressure on aging and insufficient infrastructure, which struggles to meet contemporary needs because of frequent leaks and inefficiencies.

This strain is worsened by industrial and trade activities that further increase demand and add stress to water resources and infrastructure. Unplanned urban expansion is common on the Mexican side of the border, leading to large areas in the peripheries without connection to municipal water sources and sewage. For example, in the community of Los Laureles in Tijuana, a study by *El Proyecto Fronterizo de Educación Ambienta*l (Environmental Education Border Project) found that approximately 12 percent of its population, or 1,300 households, did not have a water connection (Febregas 2024).

Inadequate wastewater treatment facilities and insufficient resources for continuous operation in Mexico lead to the discharge of raw sewage, contaminating shared water sources and affecting water quality, which makes treatment for municipal use more complex and expensive (GNEB 2023). Binational water treatment plants, such as those in Tijuana–San Diego and Laredo–Nuevo Laredo, have proven to be successful solutions. Currently, these systems face increased pressure from growth and maintenance issues, and enhanced investment and processing capacity are required (IBWC 2022).

Additionally, the absence of a coordinated binational framework for managing shared groundwater resources compounds these challenges. More than 30 known aquifers cross the border (Sanchez and Eckstein 2017), but absent common agreements applicable to particular aquifers, over-extraction and depletion can occur, exacerbating water scarcity issues (GNEB 2023, Mumme et al. 2023).

Small, Tribal, and Rural Communities

Small, tribal, and rural communities along the length of the border have a unique set of challenges related to water supply. Many of these communities have stagnant or decreasing demographics paired with aging infrastructure and limited investment. Challenges in rural areas along the border are typically characterized by their low population density and widespread geographic distribution, which together pose logistical challenges for maintaining and upgrading infrastructure. In these areas, the challenges of drinking water access are often linked to isolation and limited resources available for infrastructure development and maintenance. There is also a lack of political will to improve conditions, primarily because of the costs associated with these small systems. Many tribal and rural communities rely on small-scale water systems or individual wells, which may lack the capacity to provide a consistent and safe water supply. On the Mexican side of the border, many urban residents rely on trucked water and household cisterns or water tanks. An additional complexity is the vulnerability of sole-source water systems to climate change effects. Although water demand within these communities is related directly to their population trends and is thus relatively stable, moderately increasing or in some cases negative growth (Texas Water Development Board 2021) and extreme weather events (e.g., droughts, floods) can further impact water availability and quality.

Small water systems frequently struggle with effective operation and maintenance because of their limited customer base. These systems often lack the expertise, financial resources, and technical capabilities required for infrastructure upgrades, repairs, and installation or operation of advanced treatment technologies. Additionally, they face challenges in developing comprehensive financial planning and asset management strategies. As a result, operational issues can lead to significant service disruptions for residents (Texas Commission on Environmental Quality 2022).

Of the 4,636 community water systems in Texas, 3,542 serve a population of less than 3,300, and 2,003 serve a population of less than 500. Currently, small systems in Texas account for 92 percent of the community water systems that have outstanding health-based violations, which are largely due to naturally occurring contaminants, such as arsenic, nitrates, fluoride, and radionuclides (Texas Commission on Environmental Quality 2022). Naturally occurring contaminants often are the result of poor-quality source water options and the inability to obtain alternative sources of acceptable quality because of geographic, geological, or economic limitations. When alternative water sources are not available, treating these types of contaminants usually requires the addition of enhanced treatment at a substantial expense. In Texas border counties, currently 47 public water systems operate 100 or fewer connections, and among those, four have source issues for arsenic or gross alpha particles (Texas Commission on Environmental Quality 2024).

Colonias

As noted by the Board in its 2023 report, *colonias* are unincorporated communities in rural neighborhoods that lack adequate infrastructure or housing and are found in all U.S. border states. It is estimated that more than 800,000 residents, primarily Latino, live in more than 2,200 colonias, mostly in Texas (Rural Community Assistance Partnership et al. 2015). Without adequate planning or support, these communities have historically suffered from significant deficiencies in basic public services, particularly in access to safe drinking water and sanitation, which leads to public health challenges.

Established outside the formally sanctioned governance of nearby cities and towns, *colonias* often have relied on unsafe or unreliable water sources, including contaminated wells and hauled water, and on cesspools or non-functioning septic tanks for sanitation, with corresponding increased incidences of contagious diseases (Giner et al. 2023). *Colonias* typically have high poverty rates, around 40 percent (Federal Reserve Bank of Dallas 2015), making it difficult for residents to pay for municipal infrastructure, such as roads, water, wastewater, flood control, and street lighting (GNEB 2023).

Following ambitious state and federal funding approved between 1995 and 2008 (U.S. Government Accountability Office 2009), much of the Texas *colonia* population was connected to water and sewer service by 2015 (Giner and Pavon 2021). Nevertheless, oversized water systems in areas where expected growth did not occur have led to aging infrastructure in need of repair or replacement and high maintenance costs that are not economically viable for the communities. Complicating the matter, even when sewer and water lines are brought into a *colonia*, many of the homes do not meet building codes and therefore are unable to pass inspections to qualify for water or sewer hookups (Texas Water Development Board 2021). Residents of *colonias* rely on self-help to build their homes or make home improvements because they do not have access to credit and need to pay as they go.

The investment in water infrastructure for *colonias* resulted in some improvements in public health. Recent research has shown that residents in eight Texas counties with the largest *colonia* populations experienced a 24-percent reduction in hepatitis A incidence rate. Tuberculosis and salmonellosis rates, however, do not seem to be affected by infrastructure investment and continue to affect *colonia* populations (Giner et al. 2023).

Cross-Sectional Challenges for Drinking Water Access in the Border Region

Impact of Climate Change and Extreme Weather Events

High aridity and temperatures, alongside significant interannual and multidecadal variability in precipitation, characterize the U.S.–Mexico border region. Additionally, the border region is impacted by high daytime and nighttime temperatures, decreased and more variable precipitation than in the past, increased evaporation, less replenishment of groundwater resources, more frequent and intense wildfires, and more intense weather events and flooding (GNEB 2023, Wilder et al. 2013).

As noted by GNEB (2023) in its 20th report, the water supply for many U.S. border communities is insecure on several fronts. Climate change and long-term drought have reduced water deliveries from small streams and rivers, underground aquifers, and—most consequential—the two major basins of the Colorado River and Rio Grande (or Rio Bravo, as it is known in Mexico). Across all these community types—binational metropolitan areas, small cities, rural areas, and *colonias*—extreme weather events have a significant impact on access to reliable drinking water. Vulnerability to climate change in the border region can be compounded by growth trends, socioeconomic factors, and insufficient binational governance and collaborative mechanisms (Wilder et al. 2013). Climate change will intensify existing social and environmental burdens on the people, neighborhoods, and communities with the fewest resources to prepare and adapt (U.S. Global Change Research Program 2023).

Diversification of existing water supplies, increased efficiencies in irrigation methods, and water reuse are now frequently deployed adaptive strategies in the border region. Desalination is a rising trend for both brackish groundwater and wastewater and has recently been either initially adopted or considered in some areas (Coronado et al. 2022). In the Lower Rio Grande alone, eight brackish groundwater desalination plants have been built since 2000 (Texas Water Development Board 2021).

Ad hoc responses to possible water scarcity scenarios resulting from climate change, not based on collaborative engagement, can further aggravate sustainable access to drinking water. Some include excessive use of groundwater, breaching of regulations, a decrease in environmental flows, or pursuit of unilateral strategies of self-protection in a binational context (Duran-Encalada et al. 2017).

Trade, Manufacturing, and Infrastructure Constraints

As stated in the 2023 GNEB report, Mexico is the largest trading partner with the United States ($72.5 billion in September 2024) (U.S. Census Bureau 2024). Although most of the bilateral trade moves through border communities on trucks and rail and can cause significant negative environmental and human impacts, many benefits from these transportation routes also accrue to communities along and outside the border (Office of the U.S. Trade Representative 2024; U.S. Census Bureau 2021).

Another relevant impact to water and wastewater issues is the rapid urbanization of key locations for trade and manufacturing. The growth of urban and peri-urban communities in the United States and Mexico has outstripped planning and investment in basic infrastructure, including that for water and wastewater. For many decades, the U.S. and Mexican border regions' population growth rates have exceeded those of their respective nations (GNEB 2023).

Despite the high levels of poverty along the U.S.–Mexico border, the region is critical for the prosperity of the U.S. economy. The Mexican side of the border houses a world-class manufacturing industry, much of it owned by or dependent on U.S. businesses. U.S. border communities are centers for logistics, specialized services, and management (GNEB 2023). Industrial expansion, site selection, and trade flows are rarely based on rational determinations of comparative advantage that consider water availability, but rather on broader political and economic factors (Duran-Encalada et al. 2017).

Complexities of Binational Governance and Cross-Border Issues

Binational management of shared water resources encompasses many topics, including allocation issues, sustainable use of groundwater, transportation and treatment of shared water resources, water quality of shared water resources, wastewater treatment that affects shared water resources, water conservation, and development and management of the necessary infrastructure (GNEB 2023). The lack of a binational framework for addressing groundwater in the approximately 30 binational aquifers that report good aquifer potential and water quality (Sanchez and Rodriguez 2022) and the mismatch with Mexico related to federal versus state jurisdictions complicates sustainable management. In the case of large sister cities with a nondiversified water portfolio, such as El Paso–Doña Ana–Ciudad Juárez, over-extraction and worsening water quality are prevalent.

The disparity in stormwater management between the United States and Mexico also is worth noting, as the lack of separate systems for sewage and stormwater in all Mexican border cities leads to overflow of the water treatment capabilities during even moderate rain episodes, with its corresponding untreated discharges to shared rivers. An especially notable example of cross-border flood waters negatively impacting urban areas on the U.S.–Mexico Border is the case of Ambos Nogales. Inadequate and overwhelmed flood management infrastructure, increasing heavy rain events, and the topography of the area result in chronic binational flooding issues (Freimund et al. 2022). During the monsoon season, flooding in border cities has led to the loss of life because of the lack of infrastructure. The lack of comprehensive binational watershed management and inapplicability of the total maximum daily load methodology—as required by the Clean Water Act in a shared basin with international discharges—complicates restoring water quality in the Rio Grande.

Water rights and allocation agreements between the United States and Mexico influence water availability for communities on both sides of the border. Disputes or delays worsen water shortages and reliability issues. The Lower Rio Grande region, which spans parts of Texas and northern Mexico, faces significant challenges related to the reliability of water deliveries under the 1944 Water Treaty. More than 4 million Texans rely on the Rio Grande as their primary source of drinking water, and close to 30 irrigation districts depend on it. Of note, shortages of surface water supplies resulted in the closing of the last remaining sugar mill in the region, negatively impacting the region's economy and the quality of life of the region's residents (Tomascik 2024). Furthermore, municipal water use in the Lower Rio Grande Valley is projected to double during the next 50 years. This area, heavily reliant on the Rio Grande for its water supply, is particularly vulnerable to fluctuations in surface water availability and historically low deliveries by Mexico (GNEB 2023). As of October 2024, under the current cycle, which began in October 2020, Mexico has a shortfall of more than 313 billion gallons of water to the United States (Suggs 2024). Because of these concerns, the International Boundary and Water Commission (IBWC) worked with leaders from Texas and Mexico to develop strategies to address the shortfall. These efforts led to IBWC Minute 331, *Measures to Improve the Reliability and Predictability of Rio Grande Water Deliveries to Benefit the United States and Mexico*, signed November 7, 2024. The resolutions in the Minute will provide additional alternatives that Mexico can use to bring certainty to water deliveries and incorporate future planning efforts through binational work groups that will address hydrology, policy, projects, water quality, and the environment (IBWC 2024).

One Size Does Not Fit All: The Need to Understand the Urban and Geographical Landscape

Looking at both the landscape of challenges facing different regions along the border and potential solutions to these challenges, geography matters:

- Many rural areas see human settlements occurring at great distances from centralized utilities, and GNEB sees much potential for rainwater harvesting and desiccation technologies that are powered by onsite solar energy production.
- Rainwater harvesting can provide potable water supply on a relatively small scale with little or no negative impacts on the environment, but the aridity of the border region poses challenges with supply, timing, and reliability. Only certain subregions see adequate rainfall to provide this supply, and rainfall in many parts of the border occurs predominantly during the monsoon season.
- Agricultural to urban transfers have the potential to generate large-scale increases in potable water supply, but areas with complex water allocations or without large-scale agricultural water infrastructure have limitations.
- Similarly, tapping groundwater resources for potable water supply is limited to regions with relatively extensive groundwater resources.

Regulatory Environment for Public Water Systems Using New Technologies

A preliminary analysis of federal regulations identified a few seminal laws are relevant to the implementation of innovative water systems. The primary federal regulations or standards on potable water are the Clean Water Act for pollution in waterways and the Safe Drinking Water Act to regulate drinking water systems. The Safe Drinking Water Act directs the U.S. Environmental Protection Agency (EPA) to issue regulations for public water systems that serve 25 or more people and/or have at least 15 service connections.

The Alternative Technology Approval Protocol, approved in 1996 by EPA, provides guidance to states for the implementation of new technologies to quickly develop drinking water systems. It was designed to help eliminate delays and allow for direct development of public water systems using new technologies (USEPA 1996). This protocol might be helpful in the development of water desiccation systems. Additional considerations for the permitting process of new technologies that generate drinking water include the Justice40 Initiative described in Executive Order 14008 and new regulations by the Biden–Harris Administration to protect public health and environmental justice. These new standards need to be reviewed closely to understand the impact on the permitting and compliance process for public water systems to address climate change (U.S. Global Change Research Program 2023).

In the U.S. system of federalism, states must comply with the minimum federal regulatory standards. Generally, if there are no harmful impacts to the environment, there are no federal regulatory impacts. In Texas, public water systems that serve more than 50 people are required to have a permit. Smaller desiccation systems have been deployed at individual residences and are permitted by the county with regulatory oversight by the Texas Commission on Environmental Quality. The central question to be ascertained from a regulatory review is whether these new technologies can fit into the legal framework. GNEB's conclusion at this time is that more analysis of the regulatory requirements is needed.

Public Versus Private Water Access and Issues

The information on new technologies specific to the rural border region is analogous to the off-the-grid approach of small-scale solar energy systems, and although tremendously useful, productive, and long lasting, the energy and drinking water markets may not be the same when scaled up. Desiccation involves, at a minimum, two solar panels that absorb atmospheric water, consolidate and filter it, and deliver approximately 2 gallons per two solar panels. Unlike a conventional water system, desiccation does not involve capture and containment, treatment, and distribution. As described above, only defined public water systems are subject to the Safe Drinking Water Act. Without sampling, monitoring, and treatment, the water quality for distribution of water derived from a desiccation unit is not known. Until atmospheric conditions are better understood, it may be prudent to restrict the distribution of drinking water from desiccation units to the individual level.

At this time, private companies have developed this proprietary desiccation technology for purchase, and it appears that only individual homeowners and companies have purchased desiccation units. Although this technology may serve to provide immediate use following natural disasters and water system disturbance, interim use while communities seek to acquire the financing and engineering studies to develop a water source or connect regionally, or individual use in rural areas with no likelihood of future connection, the use of distributed drinking water from desiccation water units should undergo a public water system analysis. As with solar technology, there is no distribution beyond battery storage. Also like solar technology, the desiccation market is driven by private companies, requires little to no government regulation, allows autonomy and occupation outside of development, and prospectively could be sold for consumption. New technologies provide answers to areas in need but not a one-size-fits-all solution.

Conclusions and Recommendations

In consideration of remote areas facing limited potable water supplies, GNEB provides some possible and pragmatic solutions.

- Geography matters, and new technologies, such as desiccation, serve a niche area of rural, small, and unsupported persons without any access to drinking water.
- Additional research on operations and maintenance is needed. Table 1 documents the scale, advantages, and disadvantages of different options, and GNEB offers that exploring these potential options in the context of the geography of the regions being examined helps inform the discussion of how remote needs for potable water can be met.
- A comparative analysis of the costs for building, maintenance, and operation of the various options listed is needed.
- Funding
    - A number of possible funding opportunities exist for pilot projects on innovative supply technologies. Border communities need access to these opportunities.
    - A significant amount of funding is available in the Bipartisan Infrastructure Law and other federal funding sources. GNEB's (2023) 20th report provides an extensive review of funding opportunities.
    - Border community members are encouraged to reach out to the new EPA Technical Centers and Environmental Justice Centers to assist with grant writing.
- Regulatory and permitting considerations need to be further examined. The current regulatory environment is unclear. Although all systems must abide by the Clean Water Act and Safe Drinking Water Act, they also need to meet the standards of each border state.

The two case studies of developing desiccation technology projects included in the appendix provide a laboratory of sorts to explore the feasibility of these technologies and the challenges that deploying these technologies face. The outcomes of these projects can help inform the discussion of the feasibility of employing these new technologies.

GNEB advocates for additional funding for research and development of water supply for small, dispersed, and rural communities along the border region. Such new technologies as atmospheric desiccation provide promise, and costs may decrease when units are produced at scale and with continued technological development. To secure sustainable expansion of water supply to underserved communities, such promising distributed, point-of-use technologies need to be systematically evaluated and compared with more traditional alternatives.

Respectfully,

/Kimberly Collins/

Kimberly Collins, Ph.D.
GNEB Chair, on behalf of the Good Neighbor Environmental Board

NOTE: GNEB representatives from federal departments and agencies have recused their organizations from this comment letter.

cc: The Honorable Kamala Harris
The Vice President of the United States

The Honorable Mike Johnson
The Speaker of the House of Representatives

The Honorable Brenda Mallory
Chair, White House Council on Environmental Quality

The Honorable Michael Regan
Administrator, U.S. Environmental Protection Agency

Appendix A: Two Case Studies of Desiccation Units/Hydropanel Systems

North American Development Bank (NADBank)

NADBank has received four applications to fund the placement of hydropanels or water desiccation units. Two of the project applications did not go forward because of challenges with state permitting, issues with water quality and communal dispensaries, and questions regarding the responsible partners for operations and maintenance.

One project has been approved in concept by the Mexican representation of the NADBank board and is under review by the United States. The goal of this 5-year project is to provide access to safe drinking water through a point-of-use system at five schools located in economically distressed areas in Monterrey, Nuevo Leon. For funding to be disbursed, a training plan needs to be in place, including the list of people and their positions at the schools who will be able to perform general maintenance and management of the units. Additionally, the sponsor (Ministry for Sustainable Urban Development of the municipality of Monterrey, Nuevo Leon) must establish a maintenance reserve fund of $53,000. The primary concerns of this pilot project are the level of technical knowledge by the onsite employees, options for water storage when school is out for holidays and weekends, water quality, operations and management, and monitoring requirements over the life of the system (NADBank 2024).

The second project under development is a point-of-use hydropanel system to provide water to residents of a Texas *colonia.* This project is still pending a final project certification, a financing proposal, and full review by NADBank. Unanswered questions relate to the technical knowledge required to manage the water system and maintain safe drinking water, who the beneficiaries of the system are, and the source of matching funds.

As seen with both of these projects, concerns exist about the technical abilities of locals to maintain and operate the hydropanel systems. A set process is needed to test the water produced and ensure that it meets the regulatory norms of the appropriate authorities. Finally, it will be interesting to follow the progress of both projects, as they will help to ascertain the viability of water desiccation units as a solution to water scarcity in the U.S.–Mexico border region.

Proposed Pilot Project by the American College of Environmental Lawyers (ACOEL)

ACOEL is working to develop a pilot water project using desiccation technologies in one of the sister border cities along the Texas–Mexico border. ACOEL is working collaboratively with the Texas Commission on Environmental Quality and is focused on developing a public water system serving 50 people or fewer. The goals of the project are to install a centralized hydropanel hub to produce water for up to 50 connections and be permitted as a public water system. Permitting an array of desiccation units could serve as a good practice, if successful for small-scale systems for which groundwater quality is not apt for domestic use. ACOEL will develop the pilot proposal and conduct the final site selection, providing further information on project progress and results.

Proposed selection criteria:

1. Community size; given the varying production capacity of different atmospheric dissection technologies, small communities and *colonias* would be more apt for atmospheric desiccation pilot intervention.
2. Communities or areas without existing connections to a water system would be given priority, given the off-the-grid nature of the technology.
3. Communities with a single existing water source would be given priority to increase resilience.
4. Small communities with outstanding health-based violations due to naturally occurring contaminants or *colonias* facing similar challenges, which require costly treatment that is often economically unviable for small utilities, would also be considered.
5. Considerations need to be given to the aridity of the local environment and to local resources, including public services and human capital.

Pilot description: Following an initial study of border public water systems in Texas, four were identified as possible candidates for the intervention (Table A1), given that they have fewer than 100 connections and have source issues for arsenic or gross alpha particles: Green Acres Mobile Home Park, Candelaria Water Supply Corporation, Redford Water Supply, and San Pedro Canyon Subdivision–Upper. Other public water systems might be considered based on ongoing research and outreach efforts with border communities.

Table A1. Candidates for Pilot Intervention

Public Water Supply Name	County	Population	Source Type	Connections
Green Acres Mobile Home Park	El Paso	141	Groundwater	49
Candelaria Water Supply Corporation	Presidio	138	Groundwater	46
Redford Water Supply	Presidio	82	Groundwater	33
San Pedro Canyon Subdivision–Upper	Val Verde	150	Groundwater	61

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