Beyond Two Straws, One Glass: 
The Politics of Sharing Groundwater Across the US/Mexico Border

Two straws, one glass. During my last year of working with, and then for, the New Mexico Water Resources Research Institute on the topic of groundwater resources shared between the United States and Mexico, I often encountered images like the one above. Such images convey the important fact that, because we share transboundary aquifers, groundwater extraction on the U.S. side of the border affects groundwater on the Mexican side of the border,
and vice versa. While the image of two straws in a single glass is a useful metaphor, this paper delves into the social and political realities that make actual sharing of groundwater a complex and vexing problem.

Sharing surface water has a long history in the U.S. and Mexico. The Rio Grande River begins in south-central Colorado, flows down through New Mexico, and then heads to Texas where it becomes the international boundary between the United States and the Mexican states of Chihuahua, Coahuila, Nuevo Leon, and Tamaulipas. The Rio Grande is a transboundary river, crossing both state and national jurisdictions, and its water resources are essential to populations along its path through the U.S. and to border communities that it divides until it empties into the Gulf of Mexico. To ensure equitable sharing of this important surface water resource between the United States and Mexico, binational agreements were signed in 1906 and 1944. Meanwhile, within the United States, Colorado, New Mexico and Texas signed the Rio Grande Compact in 1938 to govern the states’ use of the shared resource.

Despite the long history of formal agreements that set guidelines for sharing surface water resources like the Rio Grande across state and national boundaries, there are no corresponding rules for sharing groundwater resources. Yet, as the population increases, and industrial/agricultural activities increase along the U.S./Mexico border, reliance on groundwater resources is also increasing. Drought conditions, climate change, and increased demands all further threaten the availability of surface water resources, leaving groundwater supplies in danger of overexploitation. The use groundwater resources that are essential to communities along the U.S./Mexico border is both unregulated and increasing.

In addition to lacking formal rules about sharing groundwater between the United States and Mexico, we also lack basic information about the characteristics of our shared aquifers as
they cross the border. The image below is an example of what water scientists and managers on both sides of the border refer to as “blank map syndrome,” in which aquifers appear to just stop at state or national boundaries. Of course, in reality the aquifers do not respect political boundaries, but images such as these created in both the United States and in Mexico give no indication as to how far into the bordering country shared aquifers extend.

The estimated number of aquifers that are shared between the United States and Mexico also varies widely. A 2012 study stated that there were between eight and twenty transboundary
aquifers on US/Mex border (Eckstein 2012), while just four years later a 2016 study identified thirty-six transboundary aquifers (Sanchez, Lopez, and Eckstein 2016).

It is not just quantity of aquifers that matters for future management of these shared resources. Quality matters as well. Some aquifers contain high quality fresh water, while others contain brackish water that cannot be used without some kind of desalination process. There are also naturally occurring or introduced toxins in some groundwater resources. Some aquifers have good quality water closer to the surface, but the water quality diminishes deeper. Therefore, declining water levels in aquifers equals declining water quality in some instances.

Then there is the question of use. Some transboundary aquifers are already essential water sources in heavy use, fulfilling urban water needs and/or agricultural and industrial needs. Others are largely untapped resources, or service only a few domestic wells. Particularly for those aquifers that are heavily used on both sides of the border, the sharing of information about extraction rates, water levels, and changes in water quality are essential when planning for the long-term sustainability of groundwater resources.

In order to facilitate the exchange of information regarding the aquifers that are shared between the United States and Mexico, On December 22, 2006, United States Public Law 109-448, the “United States-Mexico Transboundary Aquifer Assessment Act” was passed. This established the Transboundary Aquifer Assessment Program (TAAP), a program to evaluate transboundary aquifers between the United States and Mexico, which included the possibility of applying United States funding for assessment activities in Mexico. TAAP activities were designated to be facilitated by the International Boundary and Water Commission (IBWC) and stipulated that both sides should agree to study particular aquifers of common interest. Once identified, studies on the designated aquifer would occur on both sides of the border, the data
from the studies would be exchanged, and joint reports would be filed in both English and Spanish.

The image below shows the four aquifers that TAAP program participants in the United States and Mexico agreed upon as mutually beneficial to study.

At the New Mexico Water Resources Research Institute, we are focused on the Mesilla and the Hueco Bolson aquifers. We collaborate with scientists in both Texas and Chihuahua to study the characteristics of these aquifers, monitor changes in water quantity and quality, and exchange data.
Exchange of data has yielded surprising results. The maps of transboundary aquifers produced in Mexico and those produced in the United States do not line up or fit together like pieces of a puzzle as I imagined they would. Instead, there is considerable disagreement on location and boundaries of transboundary aquifers (see image below). Some aquifers that look like they should continue onto the other side of the border stop abruptly. Some that appear as a single aquifer on one side of the map look to be divided into several different, smaller aquifers. Boundaries don’t line up.

Surface water resources are easy to define. A lake has clear boundaries. A river has a clear course and its direction of flow is unmistakable. Groundwater, on the other hand, with its
complex and diverse array of geohydrological formations, is not so easy to define. In fact, there are no internationally recognized guidelines for defining transboundary aquifers, and Mexico and the U.S. use different methodological approaches to aquifer delineation (Sanchez, Lopez, and Eckstein 2016).

While there are many scientific and physical challenges to accurately assessing binational aquifers, the social and political challenges can be even greater. In a conversation about the TAAP program work, I asked a long time employee of the IBWC what was more challenging, the science or the politics of that kind of work. “The technical part is the easy part,” he answered without hesitation. While the TAAP program put in place a framework to facilitate cross-border collaboration on aquifer assessment projects and data exchange, the politics of doing so remain fraught, complicated, and tenuous.

In my first official TAAP meeting held in Juarez, Chihuahua in 2019, I quickly realized that is event was unlike the other binational water meetings and events I had participated in up to this point. While the other events were relaxed and collaborative, this official event felt tense and serious. Seated around a heavy wooden circular table, the U.S. delegation was directed to sit across from the Mexican delegation. The agenda was set, and the order of who spoke and when was rigidly hierarchical. The goal of the meeting was to arrange an exchange of data between those in the U.S. working on issues related to the Mesilla Bolson and Hueco Bolson aquifers, and those in Mexico doing equivalent work, and to plan for next steps in the binational collaboration.

After the participating parties made short presentations, the discussion of the data exchange began. What I had imagined would be a quick discussion about content and manner of exchange turned out to be a long, difficult and tense interaction. The feeling of mistrust and suspicion was palpable. The leader of the Mexican delegation expressed that their side was very
disappointed in the data that had been given to them in the last exchange that occurred years ago. Both in form and content, it seemed that the previous data was not equivalent to what Mexico had provided the U.S. side, and they did not want to repeat that scenario. Later, a longtime United States Geological Survey (USGS) employee explained that the previous data exchange was only part of the story. Additionally, previous attempts to work together had been derailed by a member of the U.S. delegation who attempted to use his position of power as an American, and control over funding, to strong arm the Mexican delegation into accepting terms and conditions of collaboration that were not beneficial to them. In the realm of joint water management, Mexico is acutely aware of its relative lack of power in comparison to the United States (García-Acevedo and Ingram 2007), and has reason to be mistrustful exchanging data on shared resources.

Such a difference in power between the United States and Mexico is really at the heart of why collaboration is so difficult. The Joint Report of the Principal Engineers Regarding the Joint Cooperative Process United States-Mexico for the Transboundary Aquifer Assessment Program (signed Aug. 19, 2009) did its best to mitigate that unequal relationship of power. It states, “No provision set forth in this agreement will limit what either country can do independently in its own territory.” And “The information generated from these projects is solely for the purpose of expanding knowledge of the aquifers and should not be used by one country to require that the other country modify its water management and use.” The power difference, however, is ever present in cross-border collaborations.

Attention to the unequal relationships of power at work in the US/Mexico collaboration through the TAAP project will be an important part of my research moving forward, especially as both sides eye moving beyond knowledge and data exchange to issues of joint management.
Without attempts at joint management of shared aquifers, scholars fear that the result will be a “race to the bottom” as both sides exploit over-drafted aquifers (García-Acevedo and Ingram 2007). Many people involved in water management from each side have discussed the unlikelihood that a formal water sharing agreement at the national level is forthcoming in the near future. With the current state of border politics at the moment, entering into negotiations over water seems like too great a political risk, despite the importance of collaborative management over this essential resource.

In the absence of national level water sharing agreements, some have suggested that local and regional collaborations for informal transboundary groundwater management are more achievable and desirable than waiting for national level legal agreements (Eckstein 2012). Eckstein (2012) argues that local communities have more vested interest in collaboration, are better informed about regional concerns, and could create more responsive and adaptable agreements suited to specific location. He advocates for the involvement of local stakeholders and decision-makers for a more equitable management of transboundary aquifers (Eckstein 2012).

The idea that stakeholder involvement necessarily equals equitable management is one that I find commonplace in the world of water science and management. I do not argue against the importance of local stakeholder involvement, but I do wish to question whether or not local and/or stakeholder driven management is necessarily equitable. Erik Swyngedouw (2009:59) warns that “Hydro-social configurations, of course, generally reflect hegemonic political, social and cultural preferences.” Even at local and regional levels, unequal relationships of power are likely to manifest themselves management agreements. While collaborative management
agreements might be a ways off, it is worth thinking ahead about how inequalities of power and representation could shape agreements about sharing transboundary groundwater resources.

By making previously ignored and politically sensitive groundwater resources legible to both the governments of the United States and Mexico, the work of the TAAP program will inevitably shape the future hydrosocial landscape of the borderlands. With that in mind, considering how to mitigate differences in power, interrogate what kinds of knowledge is produced and by whom, and exploring ways to democratize collaborative scientific and management processes will be essential parts of my work moving forward, and topics I would be very interesting in discussing further with anyone interested.

Works Cited


