

# Reflections: Testifying on Reauthorization of the Transboundary Aquifer Assessment Program

Images: Subcommittee on Water, Wildlife and Fisheries legislative hearing, Oct. 25, 2023



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On October 25, 2023, I had the honor of presenting testimony on H.R. 5874 at the U.S. House of Representatives Committee on Natural Resources, Subcommittee on Water, Wildlife and Fisheries. H.R. 5874, introduced by Arizona District 6 Representative Juan Ciscomani, amends the United States-Mexico Transboundary Aquifer Assessment Act by reauthorizing the United States-Mexico transboundary aquifer assessment program. In addition, the bill, co-sponsored by New Mexico District 1 Representative Melanie Stansbury, modifies a restriction on designation of additional transboundary aquifers along the border shared by Arizona and the state of Sonora, Mexico.

The subcommittee heard several bills. First, House subcommittee members, along with the bills' sponsors, had the opportunity to offer remarks. Then each of the invited witnesses had five minutes to comment on one or more of the bills, after which the witnesses were available to answer questions. Prior to the hearing, I submitted written testimony, from which I drew my five minutes of strictly timed oral testimony.

In his remarks at the **subcommittee legislative hearing**, Representative Ciscomani noted that water security is on the top of Arizonans' minds and underscored the importance of groundwater to communities along the border, many of which are rural and underserved. He highlighted the transboundary aquifer assessment program's role in assisting communities shape their water futures.

Representative Jim Kolbe (1942–2022), who represented Southern Arizona in Congress from 1985 to 2007, was the House sponsor of the bill to establish a transboundary aquifer assessment program. Representative Kolbe invited me to testify in May 2006 on H.R. 469, which was identical to the Senate bill introduced by Senators Jeff Bingaman of New Mexico and Jon Kyl of Arizona. Representative Raúl Grijalva (District 7), who has represented Arizona's border communities since 2003 and serves as House Natural Resources Committee Ranking Member, has likewise advanced the program.

I reflected on my first experience delivering oral testimony to a congressional subcommittee in my early 2007 essay, **Front-Row View of Federal Water Lawmaking Shows Process Works**. This latest opportunity to offer testimony on the program prompted me to reflect on the value of the program. What follows is the essence of my submitted written H.R. 5874 testimony. I omit the opening and closing remarks of thanks and the screenshot of the bulletin on the Binational Study of the Transboundary San Pedro Aquifer that was appended to my written testimony. It contains a summary of what this program has accomplished and where it is heading. I am proud to have worked on this cooperative binational program since its inception. I hope you'll read on to become familiar with the Transboundary Aquifer Assessment Program and how the partners are working strategically to foster understanding of the characteristics of shared aquifers. I invite you to email me comments and/or questions at [smegdal@arizona.edu](mailto:smegdal@arizona.edu).

# Directly from the testimony of Sharon B. Megdal with respect to H.R. 5874 dated October 25, 2023:

## Background

Like elsewhere in the Southwest – and the Nation – water security and reliability are critical concerns along the border shared by the United States and Mexico. Along the border, groundwater is a particularly important source of water for many communities, and it is the only source for some. Due to its invisibility, assessment of groundwater quantity and quality are needed. Characterizing groundwater conditions and aquifer properties will enable communities along the border to understand their water supply conditions and the implications of their water utilization. Assessments enable more informed decision making by water users, water managers, and policy makers at multiple levels.

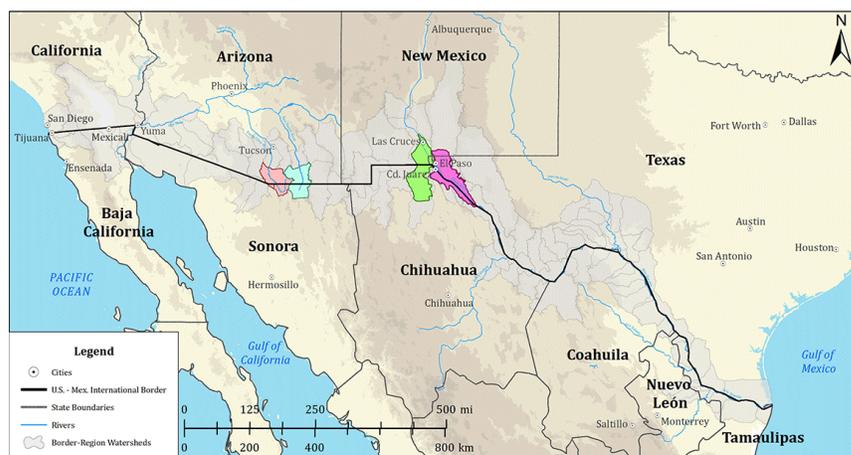
The original legislation authorizing the Transboundary Aquifer Assessment Program, codified as P.L. 109-448, became law in late 2006. It authorized the Secretary of the Interior, through the U.S. Geologic Survey (USGS), to collaborate with the states of Arizona, New Mexico and Texas, the country of Mexico, and others to characterize priority transboundary aquifers. The Act established a partnership between the USGS and the federally authorized water resources research institutes per the Water Resources Research Act of 1964, as amended, for the participating states. The University of Arizona Water Resources Research Center, for which I serve as Director, is the federally authorized water institute for Arizona, with the New Mexico Water Resources Research Institute at New Mexico State University and the Texas Water Resources Institute at Texas A&M University being the other two participating university partners. I had the honor of providing testimony at the May 2006 House hearing on the original authorization, H.R. 469 at the time, and I have been involved in implementing the program ever since its approval. This testimony reflects this involvement, along with perspectives gained from my professional academic and non-academic work on groundwater policy and management that extends beyond 30 years.

Aquifers contain the groundwater on which many communities across the country depend. Because groundwater is not visible or accessible like river water, assessments are necessary to characterize the water quantity and quality of the resource, including the rate at which groundwater is being depleted and recharged. Many communities along our shared border with Mexico rely on groundwater. Current research has established that close to 30 aquifers along this border can be considered transboundary. The national frameworks of the United States and Mexico for managing groundwater are quite different. How states and communities within the United States manage groundwater varies considerably. The Transboundary Aquifer Assessment Program authorized by P.L. 109-448 has enabled collaborative research on groundwater and the aquifers that hold it, along with binational dialogue, which has contributed considerably to developing a common understanding of this critically important water resource. With sound, verifiable information in hand, water users, water managers, and policy makers are better equipped to make decisions to support the long-term viability of their economies and communities along the border.

## An Overview of Transboundary Aquifer Assessment Program Efforts to Date

The Transboundary Aquifer Assessment Program has focused on the four priority aquifers specified in P.L. 109-448, which are shown on the map on the right. The map can be accessed at <https://webapps.usgs.gov/taap/index.html>.

Given the program's focus on internationally shared aquifers, the



International Boundary and Water Commission (IBWC) has played a key coordination role for efforts carried out binationally. The IBWC is the binational body responsible for implementing the 1944 Water Treaty for the "Utilization of waters of the Colorado and Tijuana Rivers and of the Rio Grande." It is the key diplomatic mechanism for working on water matters along the border. The IBWC's 2009 three-page "Joint Report of the Principal Engineers Regarding the Joint Cooperative Process United States-Mexico for the Transboundary Aquifer Assessment Program" established the binational cooperative framework that has guided the collaborative binational efforts to date. The six Principles of Agreement are as follows. 1. Activities described under this agreement should be beneficial to both countries. 2. Aquifers to be jointly studied, as well as the scope of the studies or activities to be done on each aquifer, should be agreed upon within the framework of the IBWC. 3. The activities should respect the legal framework and jurisdictional requirements of each country. 4. No provisions set forth in this agreement will limit what either country can do independently in its own territory. 5. Nothing in this agreement may contravene what has been stipulated in the Boundary and Water Treaties between the two countries. 6. 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 USGS website on the Transboundary Aquifer Assessment Program (TAAP) (<https://webapps.usgs.gov/taap/index.html>) provides information about TAAP studies and products, many of which have been carried out on the US side of the transboundary aquifers. The USGS site lists these key TAAP objectives:

- Develop binational information and shared databases on groundwater quantity and quality;
- Identify and delineate transboundary aquifers of importance;
- Develop binational criteria for determination of priority transboundary aquifers;
- Assess the extent, availability, and movement of water in transboundary aquifers and the interaction with surface water;
- Develop and improve groundwater-flow information for binational aquifers to facilitate water-resource assessment and planning;
- Analyze trends in groundwater quality, including salinity and nutrients;
- Apply new data, models, and information to evaluate strategies to protect water quality and enhance supplies; and
- Provide useful information to decision makers, including assessments of groundwater management institutions and policies.

Teams have been working on meeting these objectives through many investigations, reports, presentations, and dialogues. A noteworthy dialogue extending across the border region was the 2019 border groundwater summit convened by IBWC. Ongoing dialogue has been fostered by meetings of technical project teams and less formal dialogues, such as the Permanent Forum of Binational Waters (<https://www.binationalwaters.org/>), which includes significant coverage of groundwater.

One of the earlier binational reports is the 2011 report, Hydrogeological Activities in the Conejos-Medanos/Mesilla Basin Aquifer, Chihuahua, Phase I, which was facilitated by IBWC. The 2016 Binational Study of the Transboundary San Pedro Aquifer ("San Pedro report") was co-produced by the International Boundary and Water Commission, USGS, the University of Arizona, the University of Sonora, and CONAGUA (Mexico's National Water Agency). Along with the 2011 study, this first fully bilingual, binational study of a transboundary aquifer can be accessed online at the USGS TAAP website.

The San Pedro report includes compilation of much existing information and harmonization of maps to provide visual representation of the data and information. Instead of having maps that end on the respective national borders, which had been the case, this report includes binational maps that show the nature of the aquifer system that spans the border. All information, including maps, went through careful review by U.S. and Mexican experts and is published in both English and Spanish. While much of the content is highly technical, the importance of groundwater to supporting the economies of the border communities is underscored in the report's concluding section. A six-page, bilingual bulletin on the San Pedro report (appended to this Testimony) demonstrates efforts to present the information to broad audiences. The report and bulletin can be accessed at <https://wrrc.arizona.edu/programs/taap-transboundary-aquifer-assessment-program/taap-official-binational-reports>.

The process of developing the binationally endorsed San Pedro study involved constant interactions of the binational technical team. The mutually respectful approach enabled seamless transition to the development

of a similarly structured binational report for the transboundary Santa Cruz aquifer system, which is nearing completion. The Santa Cruz aquifer system provides the groundwater for the “Ambos Nogales” region, an important border region for transportation of produce from Mexico to the United States and other products. Nogales, Sonora, which is much larger in population than Nogales, Arizona, is home to many maquiladora factories. The Arizona TAAP team has developed a water balance modeling framework and performed a series of water balance analyses, which show decline in groundwater levels and over-drafting of the aquifers. The modeling approach can be used to study impact of various water management decisions.

These and additional studies of the aquifers that support population and economic centers along the border, such as the El Paso-Ciudad Juarez area, increase understanding of the uncertainties associated with changing precipitation patterns and increased pumping. They contribute to more informed water management decisions. However, additional transboundary assessment, particularly groundwater modeling, is needed. In some areas, no modeling has been done. In other regions, updated, binationally developed numerical models would provide more accurate representation of the implications of pumping and recharge on groundwater supplies.

Assessments are performed aquifer-by-aquifer or community-by-community because the hydrologic, geologic, recharge, and other conditions vary by aquifer. Groundwater is withdrawn to support municipal, industrial and agricultural uses, and groundwater supports natural riparian systems. Groundwater extraction is often occurring at rates that exceed naturally occurring recharge. Recharge rates are dependent on a host of factors, including the connected surface water flows, which themselves involve significant variability.

Many TAAP products can be found at <https://webapps.usgs.gov/taap/products.html>. Published in 2023, the book version of the special issue of the journal *Water* entitled “Advances in Transboundary Aquifer Assessment,” which was guest edited by USGS scientist Dr. Anne-Marie Matherne and me, includes several recent TAAP-funded analyses. The free PDF version of the book can be accessed at <https://www.mdpi.com/books/book/7794>. Most publications are freely accessed. The University of Arizona Water Resources Research Center maintains websites that catalog reports and publications in English (<https://wrrc.arizona.edu/programs/taap-transboundary-aquifer-assessment-program>) and Spanish (<https://wrrc.arizona.edu/programs/programa-de-evaluacion-de-acuiferos-transfronterizos-taap>). New Mexico State University’s TAAP activities and products can be accessed at <https://taap.nmwrri.nmsu.edu/>. Texas A&M has a transboundary water portal, from which information about TAAP can be found. See <https://transboundary.tamu.edu/taap/>. Additional references can be provided on request.

Through Fiscal Year 2023, a total of \$10 million has been appropriated for the Transboundary Aquifer Assessment Program. The authorizing legislation specified that 50% of any appropriated funding remains with the USGS, with the other 50% distributed to the participating Water Resources Research Institutes, though the legislation does not specify how the funding is distributed across the states. According to my records, funding has occurred as shown in the table on the right. The University of Arizona Water Resources Research Center has received one-sixth of the amounts noted on the right.

The collaborative work continues. The USGS and the Water Resources Research Institutes have prioritized five over-arching tasks for the five-year period beginning with Fiscal Year 2023:

1. Stakeholder Engagement and Capacity Building
2. Socio-Economic Context, Governance, and Policy [Note: Although USGS does not preform research related to water policy, personnel at the partner universities do engage in policy analyses.]
3. Binational Groundwater Atlas: Data Management, Mapping, and Visualization
4. Aquifer prioritization and vulnerability assessment
5. Hydrologic Studies to Understand Water Availability Challenges Facing Transboundary Aquifers – Stressors from Population, Industry, Agriculture, Drought, and Climate Variability

| Federal TAAP Appropriations through FY2023 |                     |
|--|---------------------|
| FY2008                                     | \$~500,000          |
| FY2009                                     | \$500,000           |
| FY2010                                     | \$1,000,000         |
| FY2016                                     | \$1,000,000         |
| FY2017                                     | \$1,000,000         |
| FY2018                                     | \$1,000,000         |
| FY2019                                     | \$1,000,000         |
| FY2020                                     | \$1,000,000         |
| FY2021                                     | \$1,000,000         |
| FY2022                                     | \$1,000,000         |
| FY2023                                     | \$1,000,000         |
| <b>TOTAL</b>                               | <b>\$10,000,000</b> |

The extent to which each is accomplished will depend on funding availability. The U.S. team is actively engaged in discussions with Mexico regarding their participation, particularly with Atlas preparation and hydrologic modeling and data compilation. The five-year plan notes that substantial time and effort are required for binational reports. Fortunately, the international relationships are good and the framework for cooperation has been established. Some of the international work of TAAP team members has been to underscore the strong binational water cooperation we have at our country's southern border. Although cross-border work requires substantial time, the partners can build upon past experiences with carrying out multi-agency reviews and translation of reports to identify opportunities to streamline these processes going forward. There is commitment to work together across the USGS and the university-based water institutes and across the international border.

## **The Proposed Amendments included in H.R. 5874**

Although the Transboundary Aquifer Assessment Program has accomplished a lot with the funding made available, there is still much work to be done. The partnerships established through TAAP have provided a very strong foundation for additional work. The processes and collaborations are in place for continuing and expanding these efforts.

In addition to the extension of the authorization period, H.R. 5874 includes a provision to enable the designation of additional priority aquifers along the Arizona-Sonora border. The original law envisioned the specification of additional priority aquifers along New Mexico's and Texas' border regions. However, in 2006, some water entities wanted to keep the very western, Colorado River portion of Arizona's border region outside of the Transboundary Aquifer Assessment Program. Between the time of the May 2006 hearing and the final passage of the legislation, language prohibiting designation of any additional priority aquifers along the Arizona-Sonora border was added. Section 2 (a) of H.R. 5874 would refine that prohibition by limiting it to the "Yuma groundwater basin designated by the order of the Director of the Arizona Department of Water Resources dated June 21, 1984". This change would enable other transboundary aquifers along the border, except the Yuma groundwater basin, to be eligible for study as part of the Transboundary Aquifer Assessment Program.

As someone who has worked on this program since its inception, I can attest to the productive collaboration of all involved to provide needed analyses and insights. Reauthorization will reinvigorate and reinforce the robust effort to bolster water security for our border communities and economies.

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## **Legislative Hearing | Water, Wildlife and Fisheries Subcommittee**

October 25, 2023

▶ [\*\*Full Video\*\*](#)

▶ [\*\*Representative Juan Ciscomani Remarks\*\*](#)

▶ [\*\*Dr. Sharon B. Megdal Remarks\*\*](#)

