



Water Resources Research Center



College of Agriculture and Life Sciences

The US-Mexico Transboundary Aquifer Assessment Program: The Arizona- Sonora Portion as a Case Study

**Sharon B. Megdal, Director
Water Resources Research Center
The University of Arizona
Tucson, AZ 85721 USA**

**email: smegdal@cals.arizona.edu
web site: ww.cals.arizona.edu/azwater/**



Purpose of the Presentation

- Discuss efforts to develop a binational work plan for the Arizona-Sonora portion of the United States-Mexico Transboundary Aquifer Assessment Program (TAAP).
- Discuss how TAAP objectives relate to the UN General Assembly Resolution on the Law of Transboundary Aquifers
- Contribute to discussions associated with the Internationally Shared Aquifer Resources Management (ISARM) Programme of the UNESCO International Hydrological Programme

U.S.-Mexico Transboundary Aquifer Assessment Act

U.S. Public Law 109-448 (Dec. 22, 2006)

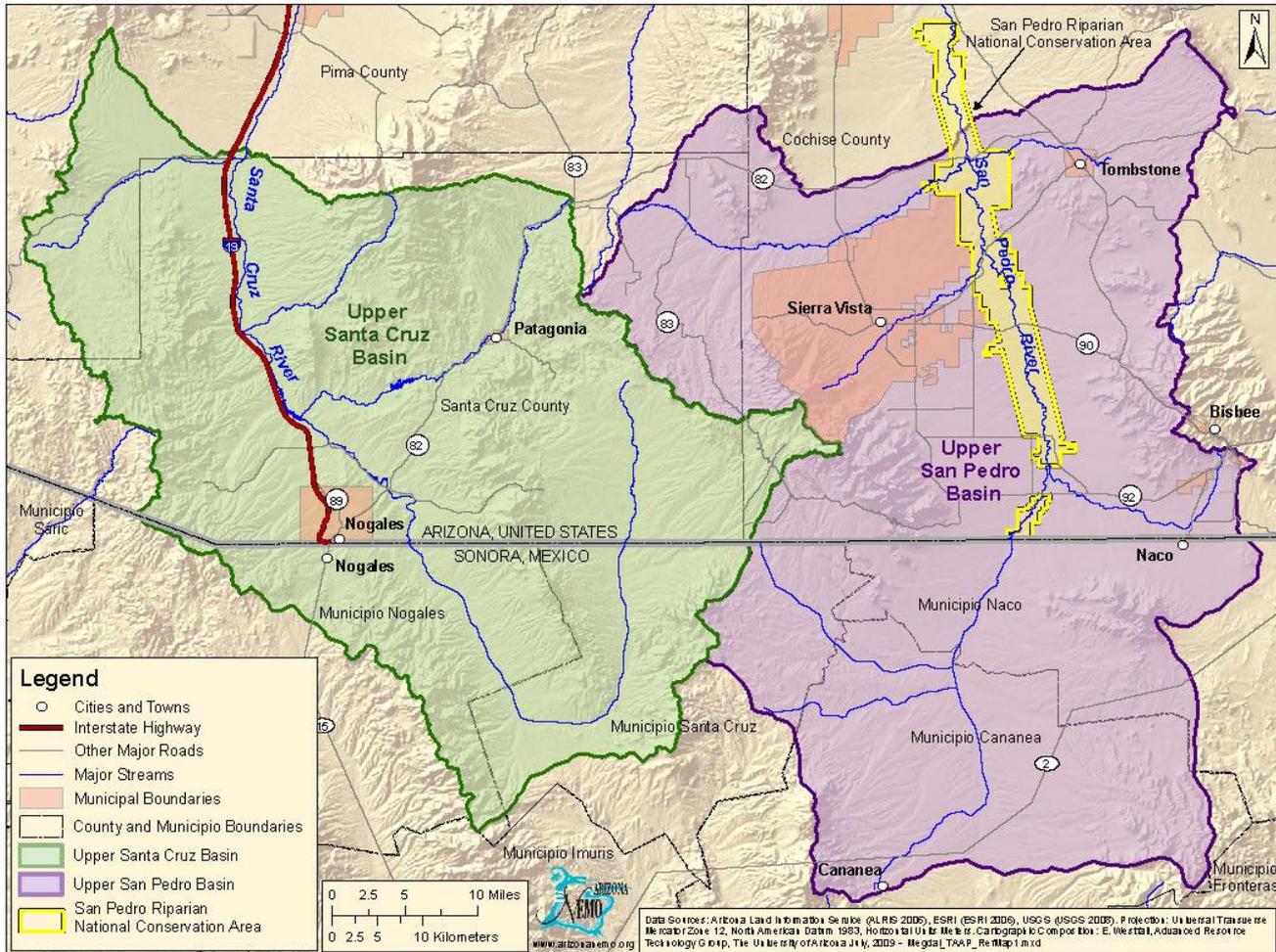
- Objectives
 - Integrated scientific approach to assess priority transboundary aquifers
 - Produce scientific products...that are capable of being broadly distributed and provide scientific information needed by water managers and natural resource agencies on both sides of the border
- 10 year, \$50 million authorization, with US Geological Survey as the lead agency (Dept. of the Interior)
- Lead non-federal collaborators are university-based water centers; Participating US states: Arizona, New Mexico and Texas; MX States: Sonora and Chihuahua
- To date, a total of \$1 million has been appropriated by US Congress for the entire program

The Arizona-Sonora effort includes two transboundary aquifers, allowing for comparisons within the case study



Santa Cruz

San Pedro



Partnerships are Fundamental

- Financial arrangements
 - 50% of appropriations to USGS
 - 50% of appropriations to Water Institutes/Centers
 - No legislated split across participating states
 - Water Institutes/Centers may subcontract with partners, including Mexico (match required)
- Secretary of Interior (through USGS) directed to collaborate with:
 - State water resource agencies
 - Any affected Indian tribes
 - Others monitoring/ metering water
 - International Boundary and Water Commission “as appropriate”
 - Mexico

Challenges

- Financial: Limited funds available to date
- Asymmetries of legal institutions
 - US federal government does not regulate water rights; in AZ it is a state responsibility
 - TAAP gave authority to USGS; International and Boundary Water Commission (IBWC) has certain responsibilities per treaty obligations but limited involvement in groundwater
 - Mexican federal agencies have authority over surface water and groundwater
 - Necessary to work through International Boundary and Water Commission for binational study efforts
 - The IBWC has a US Section (IBWC) and a Mexican Section (CILA), each with a Commissioner and professional staff

Resolution of the General Assembly

The law of transboundary aquifers

- Article 7, 2: General Obligation to Cooperate – establishment of joint mechanisms of cooperation
- Article 8, 2: Regular exchange of data and information – Where knowledge about the nature and extent of a transboundary aquifer or aquifer system is inadequate, aquifer States...shall take such action individually or jointly and, where appropriate, together with or through international organizations.

Progress

- Simultaneous with inventorying past and ongoing study efforts (e.g. hydrologic modeling), Arizona and Sonora representatives have been meeting to lay the groundwork for a binational work plan
- The IBWC's US and Mexican sections have worked over an extended period of time with representatives from USGS and the three US state water research centers to develop a Joint Cooperative Framework

Joint Cooperative Agreement was signed on August 19, 2009



**Signing Ceremony at Boundary Monument #1
in El Paso/Juarez at 1:00 PM
Principal Engineers John Merino and Luis
Antonio Rascón Mendoza**

El Paso, Texas
August 19, 2009

JOINT REPORT OF THE PRINCIPAL ENGINEERS
REGARDING THE JOINT COOPERATIVE PROCESS
UNITED STATES-MEXICO FOR THE TRANSBOUNDARY AQUIFER
ASSESSMENT PROGRAM

To the Honorable Commissioners,
International Boundary and Water Commission,
United States and Mexico,
El Paso, Texas and Ciudad Juarez, Chihuahua.

Sirs:

We respectfully submit for your consideration this Joint Report recommending the joint cooperative process between the United States and Mexico to implement an assessment program for the transboundary aquifers shared by both countries.

I. Background

Since the decade of the 1970s, there exists within the framework of the International Boundary and Water Commission (IBWC), a process for the exchange of information on groundwater along the border between the United States and Mexico. Any issues of data or studies have been addressed on a case by case basis through mutual consultation as established in Resolution 6 of IBWC Minute No. 242.

By way of example, on December 2, 1997, the IBWC issued the "Joint Report of Principal Engineers Regarding Information Exchange and Mathematical Modeling in the El Paso, Texas and Ciudad Juarez, Chihuahua Area Aquifer." The IBWC arranged for the exchange of groundwater data between both countries and the development of a bilingual publication that was produced jointly under this effort.

On December 22, 2006, United States Public Law 109-448, the "United States-Mexico Transboundary Aquifer Assessment Act" was passed, establishing a program to evaluate transboundary aquifers between the United States and Mexico, which included the possibility of applying United States funds for assessment activities in Mexico.

II. International Boundary and Water Commission's Position and Process Framework

The IBWC, United States and Mexican Sections, are aware of the interest on both sides of the border to preserve and understand the aquifers used by both countries, whereby it is considered necessary to develop a team of binational experts to assess transboundary aquifers, exchange data, and if needed, develop new datasets.

Initiatives that include transboundary water resources are traditionally coordinated through the IBWC using the customary binational cooperation process used by both

RECOMMENDATION

That the activities for the joint cooperative process related to the transboundary aquifer assessment program be adopted by the International Boundary and Water Commission in accordance with the terms described in the present Joint Report.

Respectfully,



John Merino
Principal Engineer
United States Section



Luis Antonio Rascón Mendoza
Principal Engineer
Mexican Section

El Paso, Texas, 19 de agosto de 2009

INFORME COMÚN DE LOS INGENIEROS PRINCIPALES
REFERENTE AL PROCESO DE COOPERACIÓN CONJUNTA
MÉXICO - ESTADOS UNIDOS PARA EL PROGRAMA DE EVALUACIÓN DE
ACUÍFEROS TRANSFRONTERIZOS

A los Honorables Comisionados,
Comisión Internacional de Límites y Aguas entre
México y los Estados Unidos,
Ciudad Juárez, Chihuahua y El Paso, Texas.

Señores:

Respetuosamente sometemos a su consideración este Informe Común recomendando el proceso de cooperación conjunta entre México y Estados Unidos para la realización de un programa de evaluación de los acuíferos transfronterizos entre ambos países.

I. Antecedentes

Desde la década de los 1970's ha tenido lugar en el seno de la Comisión Internacional de Límites y Aguas (CILA) un proceso de intercambio de información sobre aguas subterráneas en diferentes zonas de la frontera entre México y Estados Unidos. Cualquier asunto de información o estudios sobre esta materia se ha atendido caso por caso sobre la base de la consulta recíproca establecida en la Resolución 6 del Acta 242 de la CILA.

Como ejemplo, el 2 de diciembre de 1997, la CILA emitió un "Informe Común de los Ingenieros Principales relativo al Intercambio de Información y Modelo Matemático del acuífero en la zona de Ciudad Juárez, Chihuahua - El Paso, Texas", en el marco del cual, la CILA coordinó el intercambio de información de datos de aguas subterráneas entre los dos países, así como la elaboración y publicación bilingüe del documento conjunto generado como resultado de dicho informe.

El 22 de diciembre de 2006, se aprobó la Ley Pública de Estados Unidos 109-448, relativa al "Acta sobre Evaluación de Acuíferos Transfronterizos México-Estados Unidos", estableciendo un Programa de Evaluación de Acuíferos Transfronterizos entre México y Estados Unidos, el cual incluye la posibilidad de aplicar recursos estadounidenses para actividades de evaluación en México.

II. Marco de la Posición y Proceso de la Comisión Internacional de Límites y Aguas

Las Secciones mexicana y estadounidense de la CILA, están conscientes del interés en ambos lados de la frontera en entender y preservar los acuíferos compartidos por ambos países, para lo cual se considera necesario establecer un grupo de expertos binacionales para evaluar los acuíferos transfronterizos, intercambiar información y según se requiera, desarrollar nuevas series de datos.

Las iniciativas que incluyen recursos de aguas transfronterizas, tradicionalmente son coordinadas a través de la CILA aplicando el proceso acostumbrado de cooperación

RECOMENDACIÓN

Que las actividades para el proceso de cooperación conjunta respecto al programa de evaluación de acuíferos transfronterizos, sean adoptadas por la Comisión Internacional de Límites y Aguas en los términos descritos en el presente Informe Conjunto.

Respetuosamente



Luis Antonio Rascón Mendoza
Ingeniero Principal
Sección mexicana



John Merino
Ingeniero Principal
Sección estadounidense

Joint Cooperative Framework

- The objective of the joint cooperative process for groundwater research is to improve the knowledge base of transboundary aquifers.
- The following will be carried out within the IBWC framework:
 - Assure concurrence of the US and MX for binational aquifer assessment activities
 - Facilitate agreement on the aquifers that will be evaluated jointly
 - Establish and coordinate binational technical advisory committees for each aquifer

Joint Cooperative Framework (continued)

- Serve as an official repository for binational studies developed
- Each country will be responsible for any costs of projects conducted in its territory, in addition to selecting the participants and consultants to carry out the studies in that country. Either country may contribute to costs for work done in the other country. This contribution shall be distributed according to the process agreed upon through the IBWC.

Progress

- For Arizona and Sonora, there is agreement that the priority aquifers are the Santa Cruz and San Pedro
- The Binational Technical Advisory Committees for the AZ-Sonora aquifers are largely formed and consist of individuals that have been involved to date.
- Workshop planned for November 3-4, 2009 to further develop binational work plans for the two AZ-Sonora aquifers

Bilingual Fact Sheets, Papers and Presentations

RESUMEN: Programa de Evaluación de Acuíferos Transfronterizos E.E.U.U. – México: Sección- Arizona (TAAP-AZ)
 Los acuíferos compartidos por Arizona y Sonora Versión: 04 de Junio de 2009

Acerca del Programa

El TAAP tiene su origen en la Ley Pública 109-448, firmado por el Presidente el 22 de Diciembre de 2006, como el Transboundary Aquifer Assessment Act. El Acta aplica a los estados de Texas, Nuevo México, y Arizona donde cuatro acuíferos transfronterizos han sido designados para evaluación prioritaria; siendo el Hueco Bolsón y Mesilla en la región de El Paso / Ciudad Juárez y los acuíferos de las cuencas altas del Río Santa Cruz y Río San Pedro en la región fronteriza de Arizona – Sonora (vea mapa). El TAAP tiene un mandato para 10 años, con \$50 millones de dólares autorizados para apropiarse durante este periodo.

El TAAP-AZ (la porción de Arizona de todo el estudio) es un esfuerzo colaborativo entre la United States Geologic Survey (USGS), el Water Resources Research Center (WRRRC), y el Udall Center for Studies in Public Policy (ambos de la Universidad de Arizona). Una variedad de otros interesados de los EEUU y México han participado en la definición de prioridades para el proceso de evaluación. TAAP-AZ (los acuíferos transfronterizos de los ríos Santa Cruz y San Pedro) fue recién aceptado en el programa ISARM (Internationally Shared Aquifer Resource Management) de la UNESCO.

Progreso y Actividades Futuras

- Seguir en la formación de prioridades para la definición del plan de trabajo del TAAP-AZ.
- Dar a conocer el TAAP-AZ al público por medio de conferencias y reuniones comunitarias.
- Recopilación de materiales científicos y otra material publicada en una base de datos con facilidad de búsquedas, en línea, y bilingüe acerca de los acuíferos binacionales del Santa Cruz y San Pedro.
 - Actualmente la base de datos- Santa Cruz tiene más de 125 materiales recopiladas, y ya se ha empezado compartir esta información con el U.S. Bureau of Reclamation
 - La formación y relleno de la base de datos- San Pedro ha empezado.
- Colaborando con la UNESCO hacia el diseño de una conferencia en Tucson (el 2 y 3 de Noviembre, 2009) con un enfoque en acuíferos compartidos.

Las siguientes agencias y/o organizaciones han colaborado con la definición de prioridades para actividades del TAAP-AZ. Muchos han contribuido materiales para la base de datos.

Gobierno Mexicano	Gobierno Estadounidense	Regional	Organizaciones no-gubernamentales	Instituciones académicas Mexicanas
Comisión Nacional del Agua (CONAGUA)	United States Bureau of Reclamation (USBR)	Comisión Internacional de Límites y Aguas (CILA)	Friends of the Santa Cruz River (FOSCR)	Universidad de Sonora
Comisión Estatal del Agua (CEA) Sonora	Arizona Department of Water Resources (ADWR)	Comité de Agua de la Comisión Sonora-Arizona	Sonoran Institute	Colégio de Sonora
Organismo Operador Municipal de Agua Potable Alcantarillado y Saneamiento (OOMAPAS) Nogales	City of Nogales, Arizona		Upper San Pedro Partnership	Instituto Tecnológico de Sonora (ITESON)

FACT SHEET: U.S.-Mexico Transboundary Aquifer Assessment Program- Arizona (TAAP-AZ)
 Aquifers shared by Arizona and Sonora Versión: June 04, 2009

Timeline and Selected Accomplishments

November 5, 2007- Arizona Department of Water Resources (Santa Cruz Active Management Area) hosted first binational meeting to discuss priority setting process, define scope of TAAP-AZ in Santa Cruz basin

April 30, 2008- TAAP-AZ organized a modeling review meeting between binational stakeholders in Nogales, Arizona. Site visits to upper Santa Cruz River from international boundary north to Tubac Bridge followed the meeting.

June 11, 2008- TAAP personnel participate in meeting convened by the Upper San Pedro Partnership (USPP) in Sierra Vista, Arizona.

June 13, 2008- Site visit to Mexican reach of the Santa Cruz River coordinated by OOMAPAS Nogales, CEA-Sonora and TAAP-AZ (see Photo #1).

June 20, 2008- Arizona-Mexico Commission Water Committee meeting in Phoenix with TAAP presentation attended by U.S. and Mexican representatives, and both Commissions of IBWC and CILA.

September 18, 2008- TAAP-AZ accepted as a case study by the UNESCO Internationally Shared Aquifer Resources Management (ISARM) program

December 2, 2008- TAAP-AZ presented at the International Conference on Water Scarcity, Global Change, and Groundwater: Management Responses- convened by UNESCO at UC Irvine to global academic and water-policy management community

March-June, 2009- Binational meetings at IBWC (El Paso, TX) and CILA (Cd. Juárez, Chih.) to agree on transboundary aquifer data sharing for binational assessment activities.

TAAP-AZ Contacts: For more information please visit <http://www.cals.arizona.edu/azwater/taap>

Sharon B. Megdal, PhD (Principal Investigator)
 Director, Water Resources Research Center,
 University of Arizona
 Email: smegdal@arizona.edu
 Phone: (520) 621-9591
 Fax: (520) 792-8518

Jenna Collegary, PhD (Co-Principal Investigator)
 Hydrologist, USGS Arizona Water Science Center
 Email: jcolleg@usgs.gov
 Phone: (520) 670-6671
 Fax: 520-679-5592



Photo #1: Nogales International Wastewater Treatment Plant (see ●)

Christopher Scott, PhD (Co-Principal Investigator)
 Asst. Professor, Udall Center for Studies in Public Policy
 and Dept. of Geography & Regional Development,
 University of Arizona
 Email: csco0@email.arizona.edu
 Phone: (520) 626-4393

Prescott Vandervoort
 Research Analyst, Udall Center for Studies in Public Policy
 University of Arizona
 Email: pvc@email.arizona.edu
 Phone: (520) 626-4393



Aquifer Assessment is a prerequisite to aquifer management

- Hydrological studies
- Institutional assessments and reports
- Mapping
- Social-science investigations
- Progress will reflect differences across the two aquifers
- We look forward to sharing our challenges and our progress as an ISARM Programme Case Study

Arizona Contacts

- University of Arizona:
 - Dr. Sharon Megdal-
smegdal@cals.arizona.edu
 - Dr. Christopher Scott-
cascott@email.arizona.edu
 - Mr. Prescott Vandervoet-
plv@email.arizona.edu
- USGS:
 - Dr. James Callegary-jcallega@usgs.gov
- Web site under development
 - www.cals.arizona.edu/azwater/taap