Database Creation: Transboundary San Pedro Valley Aquifer

Basic Information

Title:	Database Creation: Transboundary San Pedro Valley Aquifer
Project Number:	2008AZ346B
Start Date:	2/27/2009
End Date:	11/1/2009
Funding Source:	104B
Congressional District:	Arizona 7
Research Category:	Ground-water Flow and Transport
Focus Category:	Groundwater, Management and Planning, Water Supply
Descriptors:	transboundary groundwater, aquifer assessment,
Principal Investigators:	Christopher A Scott

Publication

1. Vandervoet, Prescott and Christopher A. Scott, continuously updated, Transboundary San Pedro Valley Aquifer Database, at http://ag.arizona.edu/AZWATER/taap/.

Database Creation: Transboundary San Pedro Valley Aquifer

Problem and Research Objectives

The upper San Pedro River aquifer was designated as a priority aquifer for assessment activities under the Transboundary Aquifer Assessment Act, U.S. Public Law 109-448. "Evaluating all available data and publications as part of the development of study plans for each priority transboundary aquifer" is a principal objective of the legislation.

The upper San Pedro River basin in the United States has been referred to as one of the most comprehensively-studied rivers in the entire nation. A wide variety of work related to basin hydrology has been carried out, particularly in areas such as Walnut Gulch, where the USDA Agricultural Research Service has extensively monitored a confined tributary of the upper basin. The USGS monitors surface flow at Palominas, Lewis Springs, Charleston, Tombstone, and Benson, all located on the upper San Pedro. Many ecologically-focused studies have used the San Pedro River National Conservation Area as a study site, as if occupies a corridor of the river between the international border with Mexico to approximately 40 miles north, downstream.

The Upper San Pedro Partnership (USPP), a consortium of stakeholders representing various governmental and non-governmental interests in the upper basin in Arizona, has actively sought out options for sustainable use of groundwater in the region. The USPP has engaged a variety of researchers and organizations to analyze groundwater-related issues, thus significantly adding to the data related to regional hydrology. Much of this information is presented in the form of annual reports to Congress, commonly known as 321 Reports, due to Section 321 of the Defense Authorization Ace of 2004, Public Law 108-136, directing the Secretary of the Interior "to prepare reports to Congress on steps to be taken to reduce the overdraft and restore the sustainable yield of ground water in the Sierra Vista Subwatershed."

In Mexico, the northwestern office of the federal water authority (the National Water Commission- CNA by its Spanish abbreviation) created a basin commission for the San Pedro River- the Basin Commission for the Upper San Pedro River (CCARP by its Spanish abbreviation). This commission, headed by a representative of the State Water Commission presently charged with operating the municipal potable water provision system, convened and participated in meetings in Cananea, Sonora and Sierra Vista, Arizona. They actively sought to encourage engagement with US stakeholders. Although the CCARP has recently been semi-inactive, it remains an important entity related to management issues of the binational upper basin.

Despite a large amount of research having been conducted on the upper San Pedro River basin and the formation of stakeholder-lead organizations (The USPP in Arizona and the CCARSP in Mexico), few published scientific and management materials are readily accessible to an audience unfamiliar to the particular issues and organizations which address the specific topics. There exists no "clearinghouse" for materials that cross organizational or thematic

divides, even within the same geographical area. Groundwater as a fundamental resource for development is an important unifying theme among management and scientific organizations and the study of such should be link across disciplines for more robust understanding.

The objective of this research was to evaluate and compile report materials from a broad range of sources that were related to groundwater hydrology of the transboundary upper San Pedro River aquifer. The region of focus was more specifically defined as the upper basin within Mexico and the area referred to as the Sierra Vista subwatershed in the US. Published materials under a variety of themes were reviewed for inclusion in the database, as long as they were directly related to groundwater within the study area.

By reviewing source materials and compiling information on the status and location of such, the TAAP-A/S San Pedro Database provides an important service to stakeholders who may not have the resources or capacity to search and appraise reports and documents related to groundwater issues. While this is a "living document" that undergoes continual updates, the TAAP-A/S San Pedro database will be an online resource, available for download by users. The database is currently hosted on the webpage maintained by the Water Resources Research Center at the University of Arizona. The database is being provided in both MS Access and MS Excel formats, as MS Excel tends to be more common among users of the MS Office suite, though data fields may be limited in Excel.

Methodology

This project followed similar protocol as the previously created database for references related to the transboundary Santa Cruz River aquifer, an activity developed as part of the US-Mexico Transboundary Aquifer Assessment Program. Using Microsoft Access, metadata were entered for hydrological and related studies of the transboundary upper San Pedro River aquifer (encompassing the Mexican section of the river basin and the Sierra Vista sub-basin on the U.S. side of the river system). The database was created with the fields shown in Table 1, as well as specific content from source materials- such as author-provided summaries or abstracts.

The criteria for database inclusion were focused on a single particular theme-groundwater hydrology in the transboundary area of focus. Yet, this particular theme is wide reaching, which is a function of the regional importance of groundwater. Documents related to geohydrological studies, ecosystem status, management and development, and other themes made up an important component of the database compilation.

Table 1. Database Fields

Principal Author-Last Name	Principal Author- First Name	Other Authors	Year Published	Title	Type of Material	Thesis/ Dissertation
Degree/Title Obtained	Academic Institution	U of A Department	Journal Article	Journal Title	Issue	Volume
Edition/Number	Pages	Book Title	Editors	ADWR Report	Modeling Report #	Map
Number of Pages	Summary	Author Provided Abstract	Other Publishing Info	URL Link	Keyword 1-Place	Keyword 2
Keyword 3	Keyword 4	Language	Location	Location Details		

Electronic resources were searched via University of Arizona library online databases, as well as state and federal government web pages and other online resources. Federal and State-level Mexican governmental offices were visited in Hermosillo and Cananea, Sonora. The municipal water provider in Cananea, Sonora is managed by the state-level water commission (CEA-Sonora by its Spanish abbreviation), and thus no municipal-level authority was contacted. In Sierra Vista, Arizona the archival materials of the Upper San Pedro Partnership, a consortium of governmental and non-governmental agencies and entities was reviewed. Documents from the offices of the Public Works Department of the City of Sierra Vista were requested. Also, higher education facilities in Hermosillo, Sonora were visited, with the goal of acquiring print resources or access to electronic resources, as long as they were for public dissemination.

Operations occurred at the University of Arizona, in Tucson, Arizona, but site visits were made to the appropriate entities that held relevant materials for database inclusion. The project team sought input from an (informal) steering committee comprised of staff of the Water Resources Research Center (University of Arizona), USGS Tucson Science Center, Upper San Pedro Partnership, Comisión Nacional del Agua and Comisión Estatal del Agua de Sonora.

Principal Findings and Significance

Currently the database contains 131 referenced materials. Metadata as defined above has been collected and inputted for each material, though in some cases fields have been left blank due to lack of accessibility or missing information. The database continues to be updated as new materials are located or published. The database is available for download in either in either MS

Access or MS Excel file format. Fields have been translated into Spanish, though metadata remains in English, unless the original source material is in Spanish.

The TAAP-A/S San Pedro database identified the need for improved data sharing among stakeholders within the binational upper San Pedro basin. Although still in draft format, the database can fill a unique niche within this group of actors. Additional tasks include complete translation of all metadata and increased efforts for dissemination, especially within agencies and/or organizations that contributed materials for inclusion.

Copies of the database file in both MS Access and MS Excel are attached as Table 1, which only lists key database fields, to avoid a lengthy report. They can also be downloaded at: http://ag.arizona.edu/AZWATER/taap/.

The database has proven very useful in the development of work plans for binational assessment of the San Pedro aquifer, as discussed in draft format during the November 3-4, 2009 workshop titled, "Developing a Work Plan for the Assessment of the Santa Cruz and San Pedro Aquifers" <http://www.cals.arizona.edu/azwater/taap/>, which was an important planning activity under the TAAP project.

The database will continue to be developed and, we expect, accessed by researchers and other stakeholders as part of the ongoing TAAP project.

For further information contact:

Christopher A. Scott
(520) 626-4393
cascott@email.arizona.edu

Prescott Vandervoet
(520) 626-3513
plv@email.arizona.edu