

# The Water Information Center of Sonora, Mexico

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**G**overnment, academic, and private entities in Mexico house vast quantities of data related to their missions. These agencies have a responsibility to share the information with the public and private sectors. What are the best methods for distribution and how can technology help?

The Water Information Center (Centro de Consulta de Agua en Sonora) is a Web-based service created to address this issue. Maintained by El Instituto Tecnológico de Sonora in Hermosillo (ITSON), the Water Information Center was created to facilitate data distribution related to water quality and quantity issues within Mexico. It also facilitates data sharing with the United States for studies located within binational watersheds. Development of this site was financed by World Bank funds, with the aim of 1) helping engineers

within the Comisión Nacional de Aguas (CNA, the Mexican Department of Water Resources) access data necessary for decision making, and 2) making information readily available to the public so as to increase awareness of water quality/quantity issues.

## The Clearinghouse

The center's focal point is a data clearinghouse that allows geospatial metadata to be submitted and located. Primary metadata is information about the content, quality, condition, location, and other characteristics of data in a database. The clearinghouse is modeled after the U.S. National Spatial Data Infrastructure, which provides a framework for sharing geographic data.

The Water Information Center employs a clearinghouse-node architecture consisting

of three essential parts: the client (a Web-based search engine for metadata), the server (all software related to indexing of the metadata), and the metadata (a repository of metadata on maps, studies, and databases). The client uses a Web browser to connect to the center and submit search criteria. The server identifies records that meet the search criteria, and returns those records to the client, which then displays the extended metadata on the selected records.

## Performing a Search

All administrative and user interfaces of the Water Information Center are Web-based. The site is currently in Spanish, but an English version is in progress. Search options include spatial coverage, temporal coverage, keyword, and advanced search. Searches may be performed on text, geographic references, and other metadata standards. A search returns metadata that meet the search criteria. It may also include links to the actual data, but at minimum it includes contact information for the author of the report and the metadata submitter.

## The Data Behind the Metadata

So far, CNA is the only Mexican contributor of metadata to the clearinghouse, but other agencies in Mexico have been invited to contribute as well. CNA metadata describe internal studies, tables of data, and images generated during the last two years and pertain to the development of water resources as well as the water resource infrastructure in the state of Sonora. At present, the metadata describe only those items available in digital format to facilitate distribution to interested parties. Additional hardcopy information is being converted to digital format. If the metadata sought is not found in the clearinghouse, users should consider contacting the managers identified on the site so they can prioritize a response to their queries.

On the binational front, the Border Programs Unit of the Arizona Department



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of Environmental Quality (ADEQ) recently submitted metadata to the clearinghouse related to its internal Water Quality Database. The metadata provide links to downloads of potentially tens of thousands of data points associated with monitoring activities in the Upper San Pedro and Santa Cruz binational watersheds. The types of data include well locations, potentiometric data, well-construction details, streamflow measurements, and both surface and groundwater quality data, including EPA STORET codes and lab methods. ADEQ is also building metadata for water quality studies in binational watersheds undertaken by the University of Sonora in Hermosillo (UNISON). These metadata will include abstracts in English and links to a Microsoft Access database of water quality data extracted from respective studies undertaken by UNISON.

### **Metadata Submission and Maintenance**

The clearinghouse also provides services to allow submission and maintenance of metadata on the server. Consultants, government entities, and others who want to share data may submit metadata to the server. Quality control is imposed through constraints embedded in Web-based metadata entry forms. The center limits metadata submissions to information relating to surface and groundwater quality and quantity. Although the site mainly manages geographic metadata, digital information such as research reports in Microsoft Word or Adobe PDF formats, maps in JPG and GIF formats, ESRI shapefiles, Microsoft Excel and Access files, and comma- or tabular-delimited text files, is also accepted.

In order for an agency, university, or group (public or private) to submit metadata to the clearinghouse, it must contact the center's administrator via e-mail. The administrator will contact the entity in order to ensure that it is legitimate and planning to submit metadata in line with the goals of the site. Once corroborated, the administrator assigns an account with a username and password. At that point, the entity can submit metadata via a Web browser. Required metadata

fields are defined by Federal Geographic Data Committee (FGDC) guidelines and include contact information for the data, time period, and geographic extent, and an abstract describing the nature of the data. Please review FGDC guidelines for a full disclosure of metadata requirements.

Given that resources are limited, not all metadata submittals can be reviewed by the administrator. Users should be aware that metadata quality is the responsibility of the submitting entity.

### **Conclusions and Future Work**

Our main goal is to acquire, maintain, and share metadata catalogs. We believe the center provides a good forum for sharing data while minimizing the effort to recompile it from its producers and consumers, which include government organizations, agencies, and the private sector. Our work in the immediate future will focus on enhancing the usability of the site to include additional services such as GIS and online PDF document navigation.

Visit the Water Information Center at [www.aguanoroeste.org.mx](http://www.aguanoroeste.org.mx). Contact Hugo Romero at [hromero@itson.mx](mailto:hromero@itson.mx).



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