



FOCUS *on Global Resources*

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GLOBAL WATER

**Global Water:
2010 and Beyond
A Global Resources
Round Table**

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In This Issue

Global Water is a report on a roundtable held in October 2010 by CRL and the Greater Western Library Alliance, on the subject of data and documentation on the supply, quality, and use of water in the Western United States and the developing world. The roundtable was the latest forum in a series sponsored by the CRL Global Resources program. At these gatherings, researchers, librarians, archivists, and publishers examine major fields of study (such as human rights, news publishing, international studies); emerging types of research being done in these fields; and new types of evidence and documentation that support such research.

Presenters at *Global Water* surveyed the range of types of water-related information, from real-time data on stream levels collected by the U.S. Geological Survey, to the Western Waters Digital Library and other online collections of historical documentation, to proprietary models of water-distribution systems created by private consulting firms like DHI Solutions.

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On page 1: Soap Lake siphon in the Columbia Basin irrigation system in Washington State, taken near the end of the 2.44 mile-long concrete bore, c. 1942. Boasting an inside diameter of 25 feet, the siphon carries the entire flow of the West Canal from the east side of the Grand Coulee around the northern end of Soap Lake to the west side of the Grand Coulee. University of Washington Libraries, Special Collections, UW 8237.

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Many of the presenters voiced the concern that at a time when water is becoming an ever-more precious commodity, critical water-related documentation remains either inaccessible or “siloeed” in proprietary or poorly maintained digital collections. We at CRL and GWLA hope that this and the other findings of *Global Water* will be useful to libraries and archives as they shape their collecting and preservation agendas in this field.

—Bernard F. Reilly, Jr.
President

Other Global Resources Forum activities and resources

[Winter 2007–08 Focus on Global Resources Newsletter](#)—Human Rights Archives and Documentation: Meeting the Needs of Research, Teaching, Advocacy and Justice

[Winter 2008–09 Focus on Global Resources Newsletter](#)—“On the Record”: A Forum on Electronic Media and the Preservation of News

A list of previous GRN reports and presentations is available on the CRL website at www.crl.edu/grn/grn-reports.

Global Water: 2010 and Beyond

A Global Resources Round Table

Day One: Presentations



Image showing field irrigation by flooding from the pamphlet *What the Farmers say about Salt River Valley, Arizona, Compliments of the Verde Water and Power Company* (Phoenix, Ariz.: 1901). From CRL collections.

The Center for Research Libraries Global Resources Network (GRN) hosted the *Global Water: 2010 and Beyond* forum, cosponsored by the Greater Western Library Alliance (GWLA). The two-day event (October 21–22, 2010) attracted librarians, scholars, archivists, and individuals from public, private, and government sectors to assess the issues and challenges related to the identification, acquisition, preservation, and use of water-related resources.

The first day of the event featured presentations on water issues from various experts, including librarians, scholars, government officials, engineers, consultants, legal practitioners, and policy makers. These individuals provided unique perspectives on the nature and sources of documentation on water supply, quality, and consumption and related environmental issues; how such documentation is collected for traditional and emerging lines of research; and challenges encountered in preserving and ensuring access to traditional and electronic source materials on water supply and use.

On the second day of the forum, participating librarians and archivists from CRL and GWLA institutions discussed the issues and challenges identified on day one and explored ways to improve support of water-related research and policy-making. The outcome of the event was a series of strategies, policies, and practices that libraries, archives, and other repositories should adopt to accommodate the new realities of the field.

The following are summaries of issues discussed on day one. The follow-on recommendations are reported in a separate article (see below). Information in this report is based on the [round table presentations](#), and on websites and other published materials from the presenters.

Session I: Preservation of, and Access to, Water-Related Information

Following an inspiring keynote [presentation](#) on “Water and Empire in the American West: Past, Present, and Future” by Dr. Donald Worster (Joyce and Elizabeth Hall Professor of U.S. History, University of Kansas), panelists in the first session discussed how government agencies, public and private institutions, and libraries and archives have traditionally collected and preserved documentation and evidence necessary for planning and allocation of water resources.

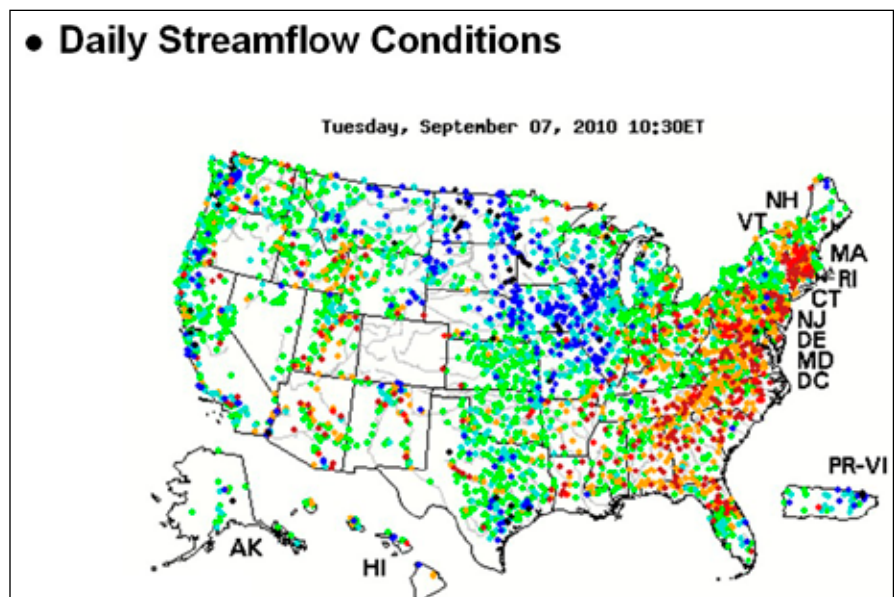
The National Water Information System

John Faundeen

Archivist, U.S. Geological Survey (USGS), Earth Resources Observation and Science (EROS) Center

The U.S. Geological Survey collects, monitors, and provides scientific information about natural resources. A significant portion of its collecting and monitoring activity is focused on water (supply, use, conditions, and behaviors). USGS maintains the [National Water Information System](#) (NWIS), the principal repository of water resources data collected from more than 1.5 million sites across the United States and its possessions. USGS employs a large network and works closely with states, non-government organizations, tribal governments, and private sector organizations. The NWIS provides a geographically seamless and easy-to-use interface to most water data maintained by the USGS. Data may be downloaded for further use, and USGS provides tools designed specifically for study and manipulation of water data.

Graphic of Daily Streamflow Conditions on Tuesday, September 7, 2010, 10:30 Eastern Time from presentation by John Faundeen, USGS EROS Center, at the 2010 *Global Water: 2010 and Beyond* forum, hosted by the CRL Global Resources Network, and cosponsored by the Greater Western Library Alliance.



Some points raised in the presentation:

- The NWIS website serves current and historical data. Data are retrieved by category, such as surface water, groundwater, or water quality, and by geographic area. Subsequent pages allow further refinement by selecting specific information and by defining the output desired.
- Once a complete day of readings is received from a site, daily summary data are generated and made available online. The USGS finalizes and publishes the daily data in a yearly or part-year series of water-data reports.
- The NWIS collects some data in “real-time” (i.e., 15- to 60-minute intervals) from a small percentage of its observation sites, for streamflow, flood or drought conditions, and other values. Data from real-time sites are relayed to USGS offices via satellite, telephone, and/or radio telemetry and are available for viewing within minutes of arrival. These data, however, are considered “provisional” and subject to revision. The USGS declares that provisional data are not citable until reviewed and approved by the U.S. Geological Survey.
- Instantaneous data are processed into and published as various daily values, such as the daily maximum, minimum, and/or mean. Historically, original

¹ For more detail, see: http://ida.water.usgs.gov/ida/about_site.cfm



Erosion and High Velocity on the Palmetto Canal of the Imperial Canal system. Joseph Lippincott Barlow, 1864–1942, Courtesy of the Lippincott Collection, Water Resources Center Archives, University of California, Riverside.

instantaneous data was not made widely available. The NWIS website now makes accessible as much historical instantaneous data from USGS data collection stations as possible. However, instantaneous values may not have been corrected and processed to the same extent as the daily values and are therefore not considered authoritative.¹

- The long-term preservation of data is an ongoing issue for USGS, as it is for all government information. The National Archives' Electronic Records Archives (ERA) System is being designed to handle all government electronic records, and USGS is participating in Phase 2 of the ERA pilot. USGS is also undertaking a "data rescue effort" to digitize historical records in paper and other physical formats (tape, photographs, physical objects) in various state and local government repositories.

California Water Data: Current Landscape and Future

Linda Vida

*Director/Head Librarian, Water Resources Center Archives,
University of California, Berkeley*

The [Water Resources Center Archives](#) (WRCA) was established in 1958 on the campus of UC-Berkeley. (The Archives are moving to UC-Riverside in January 2011). The Center is both a library and archive, collecting published information as well as archival material. The Center has 200,000 technical reports on all aspects of water (focusing on California and the West, but also reports on U.S. and international water issues). Published materials are cataloged and available in WorldCat and Berkeley's online catalog; finding aids are in the Online Archive of California. The WRCA also undertakes special project and grant-funded efforts, such as the "Origin of Western Waters" funded by NEH and accessible via the [Western Waters Digital Library](#).

The WRCA works with state agencies, using ContentDM to create metadata for digital documents and to build specialized online collections. The Center also uses the California Digital Library [Web Archiving Service](#) (WAS) to create the [California Water Districts Web Archive](#), and is currently working to collect web materials relating to the Sacramento-San Joaquin Delta.

WRCA started a project in 2009 called the "California Water DRoP" (Data Repository Project) to assess how much water data was available in online repositories and how discoverable it was. The project team conducted a series of case studies to determine what content was currently accessible in the library, and what was available online via agency websites or other resources. The team also performed a user-needs assessment as well as a data survey to better define their audience and targeted acquisitions.

Some points raised in the presentation:

- The WRCA found that while a lot of data is accessible online, the means of accessing and the comprehensiveness of the data vary greatly: numerous data sets, images, data-rich reports, in every conceivable format (paper, html, spreadsheets, databases). The number and varieties of agencies abound, with a multitude of projects and programs. Agencies operate in a dynamic environment and routinely change URLs. Metadata is not consistent across—even within—agencies, and is often simply not available or searchable.
- The primary audience of the archives (researchers and scientists, as well as engineers, consultants, and government officials) are most interested in data from state agencies, followed closely by data from federal and then local agencies. Watershed and groundwater basin data is of great interest, and most users are interested in current data, while older format digital data and non-digitized data are in less demand.

- Many agencies indicated plans to make their offline digital data available online and to migrate data in older digital formats to current formats, although a few are limited by a lack of resources. Most are wary of putting up raw data and prefer to put online data only after quality review, which is very resource-intensive.
- Water librarians may best serve the community by creating focused databases (such as catalogs of groundwater data), supporting the interchangeability of data for streamflow or meteorological data, working with agencies on best practices and discoverability of resources, and providing archiving and access support for websites and historic data (online and in print reports).

Documenting Colorado Water within and beyond its Borders

Patricia J. Rettig

Head Archivist, Water Resources Archive, Colorado State University Libraries

The [Colorado State University Water Resources Archive](#) was founded in 2001 as a joint initiative of the University Libraries and the Colorado Water Institute. It is the only archive in the state of Colorado focused exclusively on collecting water information. The Archive's mission is to "document Colorado's water," including records created in any aspect (law, policy, engineering, environmental, recreation, municipal, etc). The Archive contains 60 distinct collections of materials from organizations and individuals. The cornerstone of the collection is the papers of [Delph E. Carpenter](#) (founder of the Colorado River Compact, among others), documenting his service as lead counsel in the *Wyoming vs. Colorado* suit. Other collections include the archives of the Colorado Water Resources Research Institute, the National Water Resources Association, and Climate and Groundwater data collections. The Archive has digitized portions of its material and participates in the Western Waters Digital Library.

Some points raised in the presentation:

- The Archive engages in intensive outreach among agencies, scholars, engineers, and other members of the community. Rettig places heavy emphasis on records management, raising awareness of archiving issues and encouraging institutions and agencies to think about preservation and long-term needs.
- The Archive is working with the [Colorado Water Conservation Board](#) to build a common search interface to the CWCB's internal database of documents. The Archive is working to harmonize the search of its own digital objects with the Board's. The intent is to expand this to other institutes as capacity allows.

Session 2: New Types and Sources of Documentation

Presentations in this session focused on new and emerging modes of production of water resource data (governmental, commercial, scientific), and on how institutions and individuals are acquiring and making these accessible for research.

The Western Waters Digital Library: Building a Resource through Multi-State Collaboration & Technology

Dawn Bastian Paschal

Assistant Dean for Digital Library & ePublishing Services, Colorado State University

Gregory C. Thompson

Associate Director for Special Collections, J.W. Marriott Library, University of Utah

The [Western Waters Digital Library](#) (WWDL) is a project led by the Greater

Western Library Alliance (GWLA) and was funded by successive grants from the Institute for Museum and Library Services (IMLS) and the National Endowment for the Humanities (NEH). The WWDL is to be a comprehensive information resource for primary and secondary resources on water in the western United States. The digital library has established a viable technical infrastructure for a seamless search of a distributed collection of materials from multiple research institutions.

WWDL harvests and aggregates metadata from participating institutions to a central server at the University of Utah, using the PKP harvester, which follows the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH). Content resides at the participating institutions, which balances local control with central usability. The second phase of the project incorporated an additional 47,000 pages of documents as well as finding aids using Encoded Archival Description (EAD).

Some points raised in the presentation:

- Agreement among WWDL participants on selection of content is a major challenge, frequently undermined by competing local needs and constrained by issues of copyright, questions of risk, and value.
- Institutions agreed to use a common metadata standard (*Western States Dublin Core Metadata Best Practices*, version 2.0), but there is considerable variation in their application of some elements. In addition, legacy collections may not adhere to the current standard. Any harmonization may reduce search granularity of locally produced sets.
- Constant local development and continued evolution of technology frequently cause problems with the central harvester.
- GWLA oversight helps provide consistency, but consortia tend to be “fragile” and are subject to the competing local priorities of member institutions.
- The continued maintenance of the WWDL will require support from a larger number of institutions. Funding at public universities is shrinking, while costs continue to rise. Local funding is also subject to competing priorities.

Federated Water Research and the Texas Water Digital Library

Ken Rainwater

Professor of Civil Engineering and Director, Water Resource Center, Texas Tech University

The [Texas Water Digital Library](#) (TWDL) is a relatively new endeavor of Texas A&M, Texas Tech, and University of Texas, coordinated by the Texas Digital Library (TDL). Other universities participate in the TDL, many with their own Water Research Centers. The mission of the TWDL is “to be a centralized, online location for the research and works of university and other water resource entities in Texas, effectively federating water research currently housed at many universities across Texas.” Still in its early stages, the Digital Library is exploring the issues of workflow, target audience, appropriate content, and the relations between the various digital libraries and data sources.

Some points raised in the presentation:

- The program evolved from the digitization of local resources such as theses and dissertations; publications from water resource centers; and technical reports and project data.
- An additional component of the TWDL is the Texas Water Data Library, integrat-

ing water resources information and observation data tied to reports, articles, and other scholarly output. David Maidment (Director, Center for Research in Water Resources, University of Texas at Austin) seeks to create a framework to connect data over long distances using a GIS framework. This is the challenge CUAHSI (see below) is seeking to undertake.

- The TWDL seeks to connect all points of data, for example an article referencing an academic study, a study referencing a data set, or a professional study referencing other reports and presentations, models, or data sources.

CUAHSI Hydrologic Information System: Integrating Government and Academic Sources of Water Data for Research and Education

Ilya Zaslavsky, Ph.D.

Director, Spatial Information Systems Laboratory, San Diego Supercomputer Center

The [Consortium of Universities for the Advancement of Hydrologic Science, Inc.](#) (CUAHSI) was established in 2001 following a meeting of earth science specialists held at the National Science Foundation to focus on common needs of scientific hydrology. This community decided to organize a consortium of universities to address common infrastructure needs and the overall research and education agenda. CUAHSI supports the community by developing, supporting, and operating research infrastructure; improving access to data, information, and models; and articulating priorities for community level water-related research and observations (among [other goals](#)).

The CUAHSI [Hydrologic Information System](#) (HIS) is a geographically distributed network of hydrologic data sources and functions that are integrated using web-based applications so that they function as a connected whole. The HIS is comprised of data servers and client software for data publication, sharing, visualization, and analysis. The goals of the CUAHSI-HIS are to unite the nation's water information, to make it universally accessible and useful, and to provide access to the data sources, tools, and models that enable the synthesis, visualization, and evaluation of the behavior of hydrologic systems.

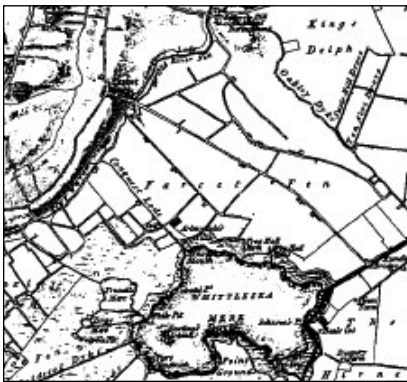
Three main components of the HIS are: **HIS Central**, which harvests metadata and enables searchability across sets; **HydroServer**, which stores, organizes, and publishes data and allows metadata to be harvested by HIS Central and data to be shared with clients; and **client applications** (such as HydroDesktop) that enable users to retrieve and access the data and metadata from the other two components.

Some points raised in the presentation:

- The variety of organizations and data sources creates a multiplicity of challenges in integrating data through a central application. CUASHI has had real success in driving the adoption of standards and uniform practices broadly in the water research and data management community. For example:
 - CUAHSI developed an **Observations Data Model** (ODM) to provide a standard relational database schema for storing observatory and individual investigator data from distributed repositories and also to serve as a central water metadata catalogue.
 - Tools provided by the HIS allow institutions to publish data into the ODM in uniform ways. External data is harvested into the HIS Central application, which matches values and maintains the metadata catalog. Currently 65 publishers (including USGS, EPA, NOAA, and others) have adopted WaterML

and are indexed in the HIS Central catalog. The data currently incorporates more than 15,000 variables, with more than 4.7 billion data values.

- The system employs an XML schema known as WaterML to provide a common output of data for use in various systems. By developing web tools and services, CUAHSI can facilitate queries across different data sources and return all data using the common WaterML language.
- CUAHSI has developed a common ontology to support the discovery of time-series data collected at a fixed point, including physical, chemical, and biological measurements. CUAHSI encourages data publishers to use this ontology, which is arranged hierarchically to enable generic or increasingly specific searches.
- As a result, a wide range of clients can manipulate and display CUASHI data sets. One freely available client developed by CUAHSI, HydroDesktop, allows the retrieval and analysis of hydrologic data. HydroDesktop is a GIS system that contains numerous tools for analysis of data and allows for export for additional use. HydroDesktop has written numerous extensions to interact with other statistical and data analysis software.
- Despite CUASHI's signal successes in generating in-kind support from a number of parties, its continuation after NSF funding ends will be a challenge.



“The meres (small lakes or ponds) in Hu on 1824 OS. All the lakes on the map are now gone.” From *Wells, Meres, and Pools: Hydronymic Terms in the Anglo-Saxon Landscape* by Mattias Jacobsson (Uppsala University Library, 1997). From CRL collections.

Session 3: New Methodologies and Areas of Water Research

How today's academic, public policy, commercial, and nongovernmental communities identify and make use of water research data.

Use of Water Data in American and International Water Law

Greg Hobbs

Justice, Colorado Supreme Court

Case law provides important precedent for water rights. Colorado was carved out of the public lands secured for the United States by the Louisiana Purchase of 1803 and the 1848 Treaty of Guadalupe Hidalgo. While the land was federal land, water was made available to the states and territories to allocate under their own systems of law. The first water law in Colorado (1861) decreed that water could be taken from the streams to lands not adjoining the waterways for “beneficial use.” As a consequence, farmers were allowed priority use of water in the territory. Subsequent interstate compacts and federal decrees established that Colorado could use only one-third of the water from its rivers per year (according to precipitation).

Over time, case law has modified rights to establish the rights of cities, businesses, land reclamation, recreation, residential, fishing, and so on. In addition, “senior” or longstanding water rights may be exchanged, sold, and negotiated. Since there are no new sources of water to exploit, it is very important to be able to understand historic and current rights, water uses, and impacts on the entire system (direct flow, storage, discharge, etc).

Some points raised in the presentation:

- Modeling, aerial photographs, historic maps, field inspection, are all key evidence in establishing water rights and in making determinations in water cases. As access to the dwindling supply of water becomes more contentious, demand for historical data will rise.

- Electronic accessibility is making this kind of research and modeling much easier, but a significant amount of the historical material is still in printed and manuscript form. Hobbs advocated for digitization of as much material as possible, and encouraged agencies and individuals to deposit materials with local archives to meet future research needs.

Water Data Needs and Applications in the Private Sector

Robert Annear

Vice President, DHI Solutions

DHI is an independent, international consulting and research organization. It was started in the 1960s as a branch of the Danish government, but became self-sufficient and operates as an independent agency (DHI is registered as a not-for-profit organization). DHI performs specialized consultancy for federal, state, and local agencies; private industries; developers; and nonprofits. DHI employs computer modeling to study water resources and related environmental and health risk assessments. It works in three large areas; surface water, coastal and marine, and urban infrastructure.

Water modeling involves the use of computers to solve numerical equations representing the physical processes of water within the natural and built environments. Common models include hydrologic models (rainfall and runoff on the land), hydraulic (hydrodynamic, discharge, and flow), water quality, and sediment transport models. Models are used to “fill in gaps” in systems that may be too complex or too expensive to monitor. They can forecast conditions, assess alternative scenarios, and predict outcomes of changes (such as climate, ecosystem restoration, or infrastructure improvements).

Some points raised in the presentation:

- For-profit organizations play an important role in producing and managing water-related information. DHI performs various services, including periodic evaluations of infrastructure, capital improvement programs, environmental impacts, and water rights and availability for a diverse range of organizations. DHI uses data from a number of sources, including federal and state agencies; local, municipal, metro areas; power utilities; and nonprofit agencies.
- Current user needs include use of data for ongoing operations, such as real-time monitoring and control of systems for water distribution and sanitary systems, irrigation water delivery, and flood control.
- Assembling and curating this data becomes a long-term challenge, as DHI is accountable for the success (or failure) of its modeling.
- Data needs for modeling are immense. The more complex the problem, the more complex the model and the more data is required to support it. There are hundreds of variables that must be taken into account to produce a reliable model. These elements include facilities operations schedules (dams, gates etc.), meteorology (air temperature, wind direction), soil characteristics, and aerial photography.

Mining for Data: The Search for Information on Groundwater Conditions and Use in the Colorado River Border Region

Mike Cohen

Senior Research Associate, the Pacific Institute

The [Pacific Institute](#) is a nonprofit research institute that works to advance environmental protection, economic development, and social equity. It was founded in 1987

and is based in Oakland, California. The Institute produces the biennial report *The World's Water*.

Cohen's work serves as a case study for use of data on water issues. He specializes in the Colorado River delta. The river basin is 250,000 square miles and supports more than 30 million people across several states. The delta region is about 1 percent of the total basin (3,000 square miles). Runoff and discharges from upstream have created unique ecosystems in the area. Its fertile soil and reliable supply of water support extensive farming and ranching, which effectively consumes the entire flow of the Colorado River before it reaches its mouth. (Discharge and return adds some water back to the water tables.)

The Pacific Institute has been studying this region—and in particular the limitrophe dividing Mexico, Arizona, and Baja, California—to explore environmental restoration of the area. In 2009, it noted a significant decrease in groundwater elevation levels over the previous five years. Pumping has increased by both the U.S. and Mexico in the past decade (approaching treaty limits on both sides), while flows along the Colorado River have decreased significantly. Many years register almost no discharge for significant portions of the year, indicating the river was completely dry.

Some points raised in the presentation:

- Cohen uses multiple sources of data, including monitoring wells and station measurements from the Bureau of Reclamation, International Boundary and Water Commission, USGS, Arizona Department of Water Resources, Comisión Nacional del Agua (Mexico), and other sources.
- Cohen reiterated that the quality of available data is always an issue, as many figures found in the daily reports (error rates using available gauges could be 10 percent or greater) are suspect. Data gaps, inconsistent measurements, errors in transcription, and other factors influence the quality of data.
- Early data is significantly harder to find. Often one has to go directly to the agencies to find this data, and there is no guarantee they will be available. Different agencies have different mandates, and some do not see a value or need in making data available or providing data to a central archive. ❖

Global Water: 2010 and Beyond

A Global Resources Round Table

Day Two: Working Sessions



Two views of the downstream face of Hoover Dam after it was completed, c. 1936. A road is visible leading up to the dam and across the top with cars on the road and parked along the edge of the road on the dam's crest. The intake towers and some transmission towers are visible. Lake Mead (the reservoir) can be seen behind the dam. Courtesy of the University of Nevada, Las Vegas Libraries, Special Collections. Manis Collection.

Working Session I: Identifying Threats and Challenges

Presenters, and participants from CRL member libraries and GWLA, discussed the most pressing issues related to the preservation and accessibility of data for water-resource research. Are institutions preserving the most important content, and doing so appropriately?

Some of the major challenges identified during this session included:

- 1. Growth in demand for water-related information and data:** The issues surrounding the use, supply, and management of water are of growing importance to the academic, policy, and business communities. Water issues permeate a number of related areas (agriculture, environment, geology). Expanded interest brings the challenge of educating non-technical users on what is available and how it may be used.
- 2. Poor understanding of uses/users/markets:** Most institutions do not have a librarian devoted specifically to water resources, and materials are often scattered throughout the general collections, government document holdings, and special collections. There has not been sufficient research on how patrons across sectors and fields are making use of collections, how they are discovering resources, and what they would like to see accessible in electronic format.
- 3. Diversity of actors/producers:** Many different types of organizations produce, collect, and distribute water resource data. These organizations include federal, state, regional, local government agencies, NGOs, development organizations, for-profit service and consulting firms, and others. The aims of these organizations vary widely.
- 4. Inaccessibility of historical information:** While most current reports and data are now made accessible online by the various producing agencies, those agencies' practices and policies on retention and availability of non-current information vary.
- 5. Non-discoverability of current information:** Even while more information is online for public use, the lack of uniformity of standards, display methods, and application of metadata make it extremely difficult for users to discover potentially relevant information.

6. **Diffusion/compartmentalization of preservation efforts:** Numerous successful efforts preserve water research data and documentation and make it available online. However, the lack of coordination among such efforts threatens to create numerous “silos” that hamper uniform access to data. Common standards, tools, and sharing of best practices are necessary to bring together disparate efforts to assist in discovery and use.
7. **Funding:** The decline of public funding (federal, state, and local) caused by the economic downturn jeopardizes a number of major open access projects that make water data available, and will probably contribute to the privatization of erstwhile public data.

Working Session 2: Toward an Action Agenda

What actions can libraries and partner organizations take to better ensure the survival and integrity of the most appropriate resources? What new models, partnerships, and investment strategies will best address these challenges? Where do we focus our efforts?

The participants of the session outlined the following priorities and recommendations:

A) Federate regional and local efforts at international level: U.S. and Canada

1. The community should exert its collective influence on the appropriate agencies of the U.S. federal, state, local, and foreign governments responsible for electronic record retention and distribution:
 - a. National Archives and Records Administration (NARA) Electronic Records Archive (ERA): work with NARA through appropriate channels (such as the USGS) to articulate and provide water community input on the development of the ERA. This development should yield trickle-down benefits to state, regional, and local government records.
 - b. Government Printing Office (GPO): communicate needs to ITHAKA, which is working with the GPO on a vision for the future of the Federal Depository Library Program (FDLP). CRL may also represent the interests through its audit and certification of FDSys, the GPO content management system for the archiving and dissemination of digital library publications created by federal agencies and established library partners.
 - c. National libraries: Articulate water community needs to National Agricultural Library (NAL), perhaps through the recently announced collaboration between CRL and the U.S. Agricultural Information Network (USAIN).
 - d. Library of Congress/Overseas Operations: work with LC staff in the field offices in India, Pakistan, Nairobi, Cairo, Brazil, and West Africa (CAORC) to strengthen acquisition of foreign NGO and government information on water.
2. Focus the attention of policy makers and granting organizations on the need for sustained federal and national-level funding for water information
 - a. Share information on best practices and models for the dissemination of water information with major funding agencies (National Science Foundation, National Endowment for the Humanities, Institute of Museum and Library Services, others) to assist in the development of guidelines for future funding cycles.
3. Exploit connections within the field and related areas to extend the availability of information
 - a. Use CRL-USAIN cooperation to plan and support efforts to preserve and disseminate water-related agriculture information.

The community should focus the attention of policy makers and granting organizations on the need for sustained federal and national-level funding for water information.

- b. Use CRL-LLMC partnership to digitize and preserve water-related legal information.
 - c. Use CRL TRAIL project to digitize and preserve water-related engineering information.
 - d. Use CRL to acquire or license water-related data sets for libraries.
4. Expand base of library support for WWDL, CUAHSI, and other water projects. Pool our resources and expertise to ensure these programs succeed and continue.

B) Standards/replicable, extensible platforms

1. Bring extant efforts to scale by federating and broadening bases of support, and certify those efforts, so that their practices, tools, and formats (e.g., WaterML) become *de facto* standards.
2. Influence NARA-ERA to mandate appropriate government agency-wide standards and practices for water-related government information. These will then become standards for state, regional, local agencies.

C) Leverage capabilities where they exist

1. Exploit infrastructure and technologies already funded and developed through federal, university, and consortium investment, such as CUAHSI, ContentDM, GIS systems, etc.
2. Utilize developing technologies and trends—such as social media—to extend the reach of projects and further awareness. ❖

Water Resources Topic Guide

Under CRL's Global Resources Forum initiative, Topic Guides survey the availability of source materials in collection areas of particular interest to member libraries. CRL will release updated Topic Guides throughout the year, especially in conjunction with collection webinars. Our newest Topic Guide on Water Resources includes essays on the current "landscape" of challenges to collecting in this field, and highlights resources available at CRL and elsewhere.

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Meeting/Schedules
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Purchases
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