

Report on Hydrologic Information Systems Efforts

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D. Goodrich (USDA-ARS, Tucson, AZ)

- I. USDA-ARS releases STEWARDS (Sustaining the Earth's Watersheds, Agricultural Research Data System) data system for web based access of ARS Experimental Watershed Data

The USDA and Agricultural Research Service (ARS) have supported watershed research since the 1930's with sites added periodically to meet evolving needs. However data from ARS watersheds have been managed and disseminated independently at each research location, hindering accessibility and utility of these data for policy-relevant, multi-site analyses. Comprehensive, long-term data for watershed systems across diverse locations are essential for interdisciplinary hydrologic and ecosystem analysis and model development, calibration and validation.

A team within the Conservation Effects Assessment Project - Watershed Assessment Studies has developed a web-based data delivery system to provide access to soil, water, climate, land-management, and socio-economic data from fourteen watersheds. The system, STEWARDS: Sustaining the Earth's Watersheds, Agricultural Research Data System, allows a variety of users to search, visualize, and download data via the internet. STEWARDS consists of: 1) a centralized site with Web/SQL/ArcGIS servers and application software, including a database management system (DBMS) and a geospatial data access portal; 2) data: including measurement data, imagery/GIS, and metadata; 3) users; and 4) research watershed sites that are data sources. Anticipated benefits of STEWARDS include preservation of data, increased data use, and facilitation of hydrological research within and across watersheds with diverse collaborators. (<http://arsagsoftware.ars.usda.gov/stewards/index.asp>)

- II. CUAHSI HIS efforts (update provided by Prof. David Maidment, UT-Austin)

(1) Progress is being made to evolve WaterML into an international standard for the exchange of water observations data via web services and to integrate that standard with existing standards for the exchange of geographic data via web services. The Open Geospatial Consortium (OGC) is an association of about 300 institutions internationally that has established the Web Map Service, Web Coverage Service and Web Feature Service, which are vendor-independent, widely accepted standards for the transmission of geographic data via web services. Prof. Maidment spoke at the OGC quarterly meeting in Atlanta about our interest in establishing a Hydrology Domain Working Group to extend those standards to cover hydrologic data, and he was joined there by representatives from the Australian CSIRO and Bureau of Meteorology. This Working Group will likely be formally established at the next OGC Meeting to be held in Valencia, Spain, in December, and it will be jointly chaired by Rob Vertessy of the Australian Bureau of Meteorology and David Maidment. A related activity is being considered by the Commission for Hydrology of WMO as part of its work program for the next several years, being decided by a meeting in Geneva in early November. It will take several years to work all this through these organizations and to reconcile our efforts with those proposed elsewhere, but the anticipated outcome is an International Standard for transmission of water observations data as a web service affirmed by the International Standards Organization to which both WMO and OGC contribute.

(2) The CUAHSI HIS project was subjected to a review by the CUAHSI Standing Committee for HIS at a meeting in July in Boulder, CO, and for the purpose a summary report was prepared that can be obtained at

<http://his.cuahsi.org/documents/HISOverview.pdf> An inventory of all data services provided by CUAHSI Water Data Services shows that our National Water Metadata Catalog maintained at the San Diego Supercomputer Center now indexes 342 million data measured at 1.75 million locations in the United States. This is the most comprehensive catalog of water data existing in the nation.

(3) As part of the review at the Boulder CUAHSI meeting, the HIS team announced the availability of HIS version 1.1 that includes a new data loader and improved schema for storing hydrologic observations data, and improved tools for ingesting those data into Excel and ArcGIS. These developments are described in the overview report I have cited.

(4) Performance evaluation of our WaterML web services show that they deliver time series data at a rate of about 30,000 values per second if the service is built and maintained locally, at 5000 values per second if the service is a native WaterML service extracting data from a CUAHSI ODM database at a remote location (such as a CUAHSI University partner), and at about 1000 values per second if the data are coming through a proxy WaterML service maintained at the San Diego Supercomputer Center onto one of the national data archives (USGS, EPA, NCDC, NRCS).

(5) The National Climatic Data Center has established WaterML web services to its hourly and daily weather observations globally. These provide access to weather observations up to 1.5 days back from the present time at about 13,000 stations around the world. This is the first global CUAHSI water data service. The hourly data service provided by CUAHSI to this information is:

http://water.sdsc.edu/wateroneflow/NCDC/ISH_1_0.asmx?WSDL

and the daily data service is

http://water.sdsc.edu/wateroneflow/NCDC/ISD_1_0.asmx?WSDL

(6) The HIS team have started providing data via CUAHSI web services from Snotel, and hope to improve that service by direct ingestion of web services from the NRCS Water and Climate Center in the future. The present service is available at:

http://river.sdsc.edu/snotel/cuahsi_1_0.asmx?WSDL

(7) A CD summarizing CUAHSI Water Data Services is being prepared for release at the AGU meeting in December.

(8) The Texas Water Development Board announced the formation of a Texas Hydrologic Information System based on CUAHSI HIS technology at the Texas GIS Forum on October 27. The TWDB is sponsoring the publication of state level observations data in CUAHSI ODM format and provision of WaterML web services from those data. A list of 10 new water data services for Texas is at <http://data.crwr.utexas.edu> and a new web site www.waterdatafortexas.org is in the process of being established. The Texas Natural Resource Information System is building a statewide data viewer for these Texas water data services.