

The Water Management Data Model (WaM-DaM): A Universal Standard to Communicate Water Systems Data

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There is an increased challenge to effectively manage scarce water resources. State-of-the-art management uses data-intensive models that require up-to-date, consistent, accessible, well organized, and documented data and its associated metadata. Currently, data to describe water systems is scattered across numerous sources, data providers, and models. Each source and provider has its own way to organize and store data and uses varied terms and phrases to describe data. Further, many operational aspects like decisions on how much water to release from a reservoir or the reason(s) to make releases are rarely documented. As a consequence, water managers and researchers spend a lot of time to compile data from scattered sources to build models of large systems.

To overcome these challenges, we are developing the Water Management Data Model (WaM-DaM) as a universal standard to search, organize, describe, and manipulate network-based data with emphasis on water systems and water management data. The creative design of the WaM-DaM allows users to represent a node and link network of water management system components like reservoirs, canals, water use sites, and operations that involve those components. The data model also supports structured metadata fields that describe who collected data for the components, how and where the data were collected.

There are four benefits to use the WaM-DaM standard to describe and organize water management data. Managers and practitioners can: 1) search for data that are published by other agencies, 2) efficiently import searched data into local data systems, 3) use data to run water management models such as WEAP and HEC-ResSim, and 4) easily share model data and results with colleagues. As an illustration of these benefits, WaM-DaM can answer user questions like: for what models does WaM-DaM currently have data? What additional data is

needed to populate a WEAP model? Where can I find that additional data? Moreover, other users can ask the same questions and reproduce similar results should they later repeat the process. Following a consistent method to search data, populate it, and run a model will increase transparency and reliability as well as minimize errors. Use of WaM-DaM will reduce the time it takes managers and researchers to set up and run models for large systems.

Figure 1 shows WaM-DaM capabilities to search, organize, and transform water management data to use in different models and applications. We are collaborating with the Hydra software developers in the University College of London to integrate WaM-DaM with Hydra to physically store and visualize the water management data that WaM-DaM handles. We will publish WaM-DaM and make it available to the public as an open source data model to help advance and facilitate the searching and organization of water systems data. And finally, we are developing WaM-DaM as part of a U.S. National Science Foundation funded multi-institutional research project called “Cyber-Infrastructure to Advance High Performance Water Resource Modeling” (CI-Water). For more info visit <http://ci-water.org>

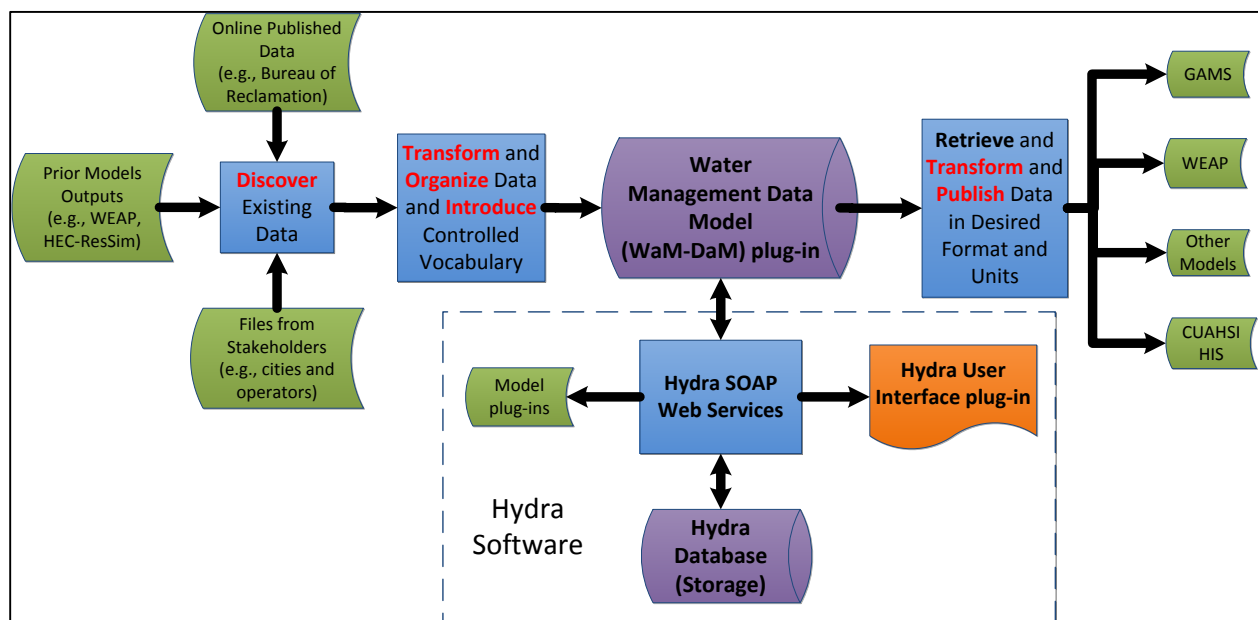


Figure 1: WaM-DaM in a Workflow