

2019 WSWC Water Information Management Systems (WIMS) Workshop/USGS National Water Use Data Collaboration

September 16-19, 2019 | Fort Collins, Colorado

2019 WIMS/USGS Workshop Summary Report, December 2019

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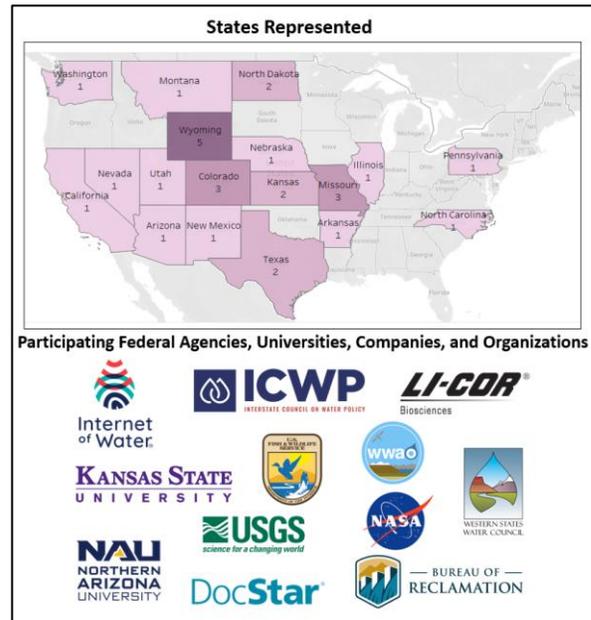
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On September 16-19, 2019, the Western States Water Council (WSWC) and the U.S. Geological Survey (USGS) co-hosted and organized the Water Information Management Systems (WIMS) and USGS National Water Use Data Collaboration workshop, held at the USGS Fort Collins Science Center in Fort Collins, Colorado.

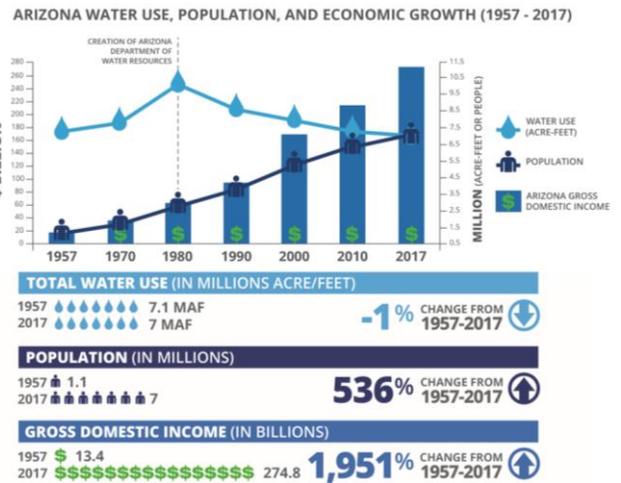
Water use data is critical to long term water supply planning and resource management. State and federal agencies both face challenges in the collection, maintenance, and distribution of high-quality water use data. This workshop provided a forum to bring together state and federal agencies, universities, private sector companies, and nonprofit organizations (NGO's) to exchange information on the status of water use data, financial assistance, collaboration opportunities, science applications, and tools. WSWC introduced the new version of Water Data Exchange (WaDE Ver.2.0), and the USGS summarized progress in the Water Data and Research Program (WUDR), a federally appropriated financial assistance program authorized by the SECURE Water Act (P.L. 111-11, Sec. 9508) for state water resource agency's use to facilitate

improvements to water use data collection and distribution.

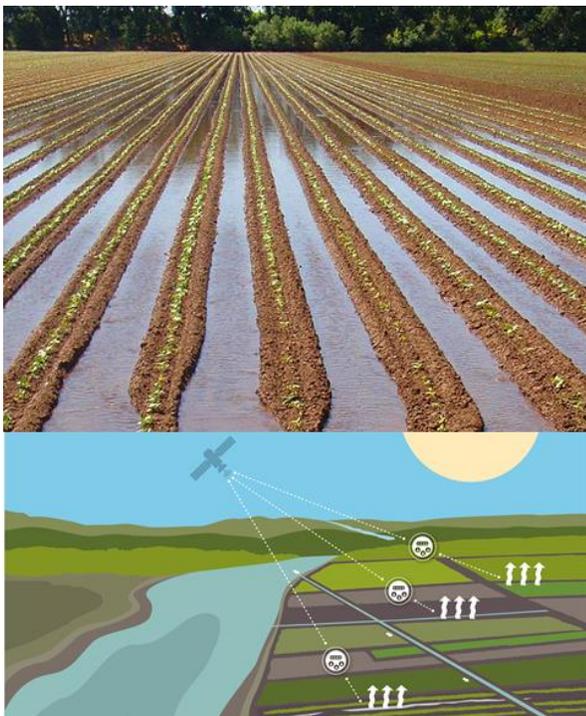
The workshop included 32 presentations and three break-out sessions on a series of panels addressing four main areas related to water use estimate and data management: 1) data gaps and challenges, 2) data quality assurance (QA), quality control (QC) and standards, 3) data access challenges, and 4) temporal and spatial reporting scales for water use data.



The first workshop day covered the following topics: high-level overviews of water information management systems and the importance of data and its publication for western water sustainability, the importance of water use data to USGS Water Mission Area Programs, WaDE’s improved architecture and advances, federal agency collaboration; and reliance on good water use data and science in the Colorado River Basin, as part of the U.S. Bureau of Reclamation’s consumptive use and losses reporting, and then highlighting the important collaboration between USGS Earth Resources Observation and Science (EROS) with the Western Water Applications Office (WWAO) of the National Aeronautics and Space Administration (NASA). The Desert Research Institute (DRI), NASA, and USGS are collaborating on expanding capacity to access satellite recorded evapotranspiration (ET) data, which provides vital assistance to states assessing crop water use consumptive and estimates. State representatives (18) reported on current status, progress, and future plans regarding water use data programs, best practices for aggregating utility customer data to maintain privacy, and new automated data delivery capabilities.



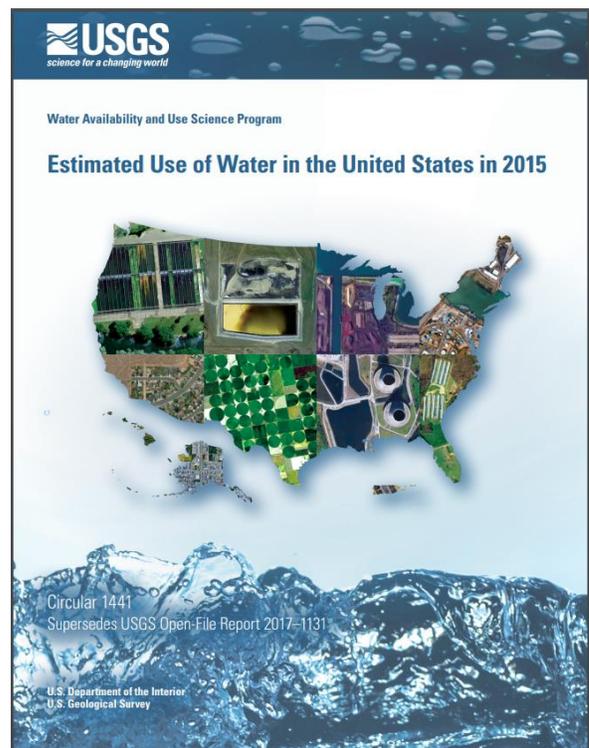
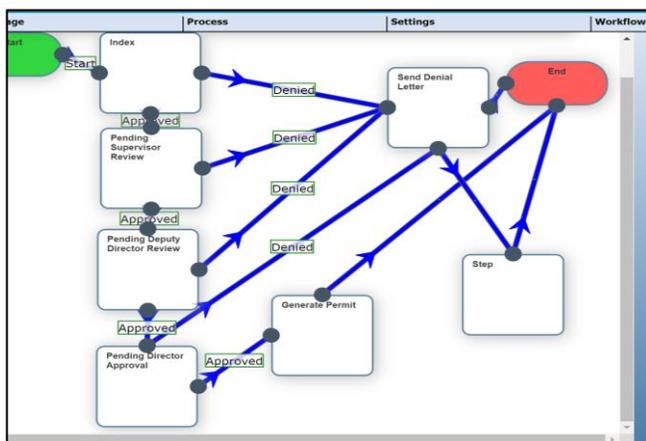
The majority of presentations on the second day focused on western states water use data efforts, including data science and enterprise data management, data engagement and integration, and lessons learned from planning for the future. Presentations also focused on important water supply planning, including illustrations and demonstrations of online water service boundary viewers. Water management in the west must include understanding reservoir operations, which includes both estimating reservoir evaporation and upgrading of monitoring networks to account for reservoir levels. Understanding the mechanics and impacts of irrigation systems on water use is important, as irrigation is the predominant consumptive use in the U.S. Methods to estimate accurate measures of irrigation water need and use were the of several talks, all promoting a stronger tie into the use of remote sensing tools. Finally, all data should be FAIR (Findable, Accessible, Interoperable and Reusable), a mandate important to the Internet of Water (IOW), which was presented by University and NGO’s participants who explained their organization’s role in facilitating regional water use estimation and reporting, as well as improving forms of common water terms and glossaries.



The third day of the workshop started with presentations on the USGS WUDR Program, which has provided financial assistance to many states in the U.S. and is currently going into its fourth year of awards (FY2020). Participating states have been granted financial assistance to improve their water use data collection, storage, and dissemination. This workshop provided a great forum for states to share their data advances with others. States that have participated in WUDR and have shared their data through the WaDE software are examples of good data and system modernization, which is important for IOW development. The workshop dedicated significant time to regional and state water use data efforts using remotely sensed water data and gridded weather datasets to estimate ET for water use mapping and water budget studies in diverse ecosystems. Then a talk followed and presented the efforts on mapping and modeling inter-basin water transfers, which is a relevant water management activity to the western states and a challenge in regional and national water modeling activities. Another talk followed which discussed refining per-capita use coefficients and their ability to be used in other areas in the country with similar situations on water use where large population fluctuations have occurred due to impacts to oil and gas mining. The workshop also benefitted from a tool demo from DocStar, a private sector technology firms who provided excellent examples on tools for water use reporting and document management.



The workshop dedicated the final half-day time for three breakout sessions that gave participants the opportunity to share information. Each session discussed and contrasted the status of water use estimates at each participating agency and listed their challenges and how they could benefit from the WUDR and WaDE programs.



The breakout sessions identified six factors that influence the current water use estimates and reporting and their related challenges within the state agencies. Those six factors are staff, information technology (IT), statutes or laws in effect, procedures or methods, cost, and space and time reporting limitations. **The following is a synthesis of those six identified factors that are affecting water use estimates and data sharing:**

1. **Staff:** staffing issues such as hiring, retirement, and the bureaucracy in reporting between IT and water agencies or within, such as the divide between regulatory and planning agencies. The lack of dedicated staff affects the agency's ability to perform regular tasks, such as field visits to check meters, verify diversions, etc. Staff also need training in data and metadata management, quality assurance (QA) and quality control (QC) methods, and use of technology and maintaining it.



2. **Information Technology:** the availability (or lack thereof) and the diverse use and user-friendly software and database technologies affects a staff's and water users' (e.g., farmers) ability to report water use. The lack of access to the internet or even computers can make it very difficult to report water use from and to users. For example, online water use reporting forms are not accessible to remote farmers. The lack of data standards enforced within state agencies can have serious data integrity issues such as missing data or data not connected with

other relevant metadata or does not support referencing in space or time.

3. **Statutes or Laws:** ultimately, regulations define the voluntary or mandatory process of collecting data, the thresholds of reporting, and whether there is a reward or punishment for reporting. Each state has its own statutes or laws on reporting that range from very strict (e.g., Kansas) to more voluntary (e.g., North Dakota). In addition, there are challenges in maintaining privacy with data collection and reporting, such as disseminating water use information from private information and ensuring that the latter is not disclosed.



4. **Procedures and Methods:** methods used to collect, estimate, and report data vary between states. Some states have advanced automated QA and QC procedures to perform checks and verifications, while others use basic manual checks. In short, there is a diversity in state procedures and a lack of data collection standards to gather, verify, and report data between states and agencies.

5. **Cost:** budgets for technology and running water planning and estimates programs have a major impact on providing consistent water use data. Many states use proxy methods (e.g., OpenET) to estimate water use when it is too expensive to install meters. Budgets also affect the types of technology used, such as open source or proprietary solutions and in-house or off-the-shelf software solutions.

6. **Space and Time Reporting Limitations:** planning efforts often focus on political boundaries (e.g., Country) while science is interested in natural hydrologic boundaries (e.g., HUC). It can take many months of work on cleaning the water data estimates so they can be released publicly. Meaning there is an inevitable time gap between actual use and reporting. As a result, errors in the data can appear. For example, monthly or annual time steps are more commonly used while daily steps can be impossible, even though specific statutes may require reporting at different time intervals. Discerning exact latitude and longitude values for farmers (e.g., wells) can also become a problem when reporting.



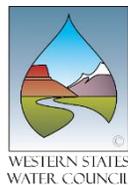
As a follow-up to the workshop, many of the state agencies' representatives were very interested in learning what were other state's approaches in estimating and sharing water use and their data. Thus,

the WSWC staff is working on a survey to collect information on the following: different software systems and their costs as used by states agencies, and a list of QA/QC methods used to improve water use estimates and data sharing. The survey results are expected to be a valuable resource to the WSWC member states and their agencies as a tool to fit their unique needs.

Similarly, the USGS has compiled a whitepaper (<https://water.usgs.gov/wausp/wudr/files/WUDR-CompletedProjects-20191107.pdf>) which summarizes current (as of August, 2019) WUDR projects, public access to state workplans and final technical reports (<https://water.usgs.gov/wausp/wudr/>). USGS has also provided a monthly open-forum webinar series to create a community of practice exchange of ideas and success stories.

Overall, the WIMS/USGS National Water Use Data Collaboration workshop was a success and spurred discussions and collaborations around lessons-learned on water use estimates and reporting from experts across numerous state and federal agencies among other private and academic organizations.

All WIMS/USGS workshop presentations, speaker bios, and other meeting materials are archived, and can be accessed on the WSWC's WIMS workshop webpage: <http://www.westernstateswater.org/2019-wims/>. The next WIMS workshop is expected to be held in 2021.



Downtown Fort Collins, Colorado