Recommendations: Updating Water Rights Data in California

California's Water Rights Data System is due for an overhaul. California State leaders recently allocated $30 million for water rights data infrastructure, the largest information technology investment in State Water Resources Control Board history. This investment recognizes that our current water rights data system is outdated and inadequate to support effective decision-making faced with longer, hotter, and more extreme weather. Informed by a dialogue series with diverse expertise and interests, this paper summarizes key findings and makes recommendations for how to build a new, modern water rights data system that is useful today, and will remain relevant for years to come.

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Background

California's current water rights data management system presents a range of challenges, being:

Paper: Many maps and other documents that help define water rights exist only on paper.

Inflexible: Changing or adding new functions to the current electronic data management system is difficult, and in many cases, impossible.

Siloed: The data management system is not federated. Data from different sources are stored in different forms and in different places, leading to gaps in documentation and preventing integration with other datasets.

State leaders have recognized that California's outdated water rights data system is not equipped to provide the State nor water rights holders the information necessary to deal with longer, hotter, and more extreme weather. As part of the state's 2021-22 budget, the Governor and Legislature allocated $30 million to modernize the data system, representing the largest single investment in information technology infrastructure in the history of the State Water Resources Control Board (State Water Board), and the largest investment in water rights data in decades. In response, the State Water Board, in collaboration with the California Department of Technology, has launched "Updating Water Rights Data for California" (UPWARD).

While the limitations of the current data system are widely acknowledged, there is less clarity around solutions. UPWARD aims to develop solutions by modernizing the water rights system. A key component is developing an effective water rights data system that delivers timely and accurate information for water decisions, enabling better water management and increasing our resilience to climate extremes. Because the funding now available may not cover a full update to state-of-the-art standards, the most critical data management reforms should be prioritized. In early 2022, the Water Foundation worked with the Consensus Building Institute to facilitate a series of three dialogues about the opportunity that UPWARD presents to enhance water resilience in the face of ongoing climate change. We sought to identify areas of alignment around the most urgently-needed data reforms. Informed by these conversations, this paper summarizes key recommendations to the State Water Board about priority data needs, including areas that UPWARD should address to improve water decision-making.

Participants

We thank the following water leaders who participated in at least two dialogue sessions:

Drew Atwater, *Deputy General Manager, Moulton Niguel Water District*

Jessica Bean, *Environmental Program Manager, Division of Water Rights, State Water Board*

Jennifer Clary, *Executive Director, Clean Water Action California*

Matt Clifford, *Staff Attorney, Trout Unlimited*

Juliet Christian-Smith, *Senior Program Officer, Water Foundation*

Erik Ekdahl, *Deputy Director of Water Rights, State Water Board*

Josué Medellín-Azuara, *Associate Professor, UC Merced*

Mike Myatt, *Program Officer, Water Foundation*

Tara Moran, *Executive Director, CA Water Data Consortium*

Nell Green Nylen, *Senior Research Fellow, Wheeler Water Institute, UC Berkeley*

Jack Rice, *Owner, Western Resources Strategies and Board Member, Cal Rangeland Trust*

Elizabeth Salomone, *General Manager, Mendocino County Russian River Flood Control and Water Conservation Improvement District*

Lester Snow, *Board Member, California Water Service Group*

Brent Vanderburgh, *Senior Engineering Geologist, State Water Board*

Willie Whittlesey, *General Manager, Yuba Water Agency*

Water rights data are a particularly important ingredient for understanding and improving our water system. But they are currently difficult or impossible to use for many kinds of decision making, because California still relies largely on paper records. California's existing Electronic Water Rights Information System (eWRIMS) is incompletely populated and lacks the functionality and interoperability with other platforms. Because of this and other shortcomings, stakeholders and State agencies have trouble understanding how much water is available at particular places and times—information that is central to basic water allocation decisions and to planning for changes in future water availability (Kiparsky et al 2021).

Key Findings

There are several reasons why an updated water rights data system is valuable. Dialogue participants ranked the following as the most important functions of a modern water rights data system:

- Supporting improved implementation of existing water rights system.
- Enabling the collection of higher quality diversion data (where, when, and how water is diverted and used).
- Facilitating better understanding of the tradeoffs in water allocation decisions.
- Improving the ability to obtain important information on existing rights (e.g., documents, history, diversion data).

The current water rights data management system is called the Electronic Water Rights Information Management System, or eWRIMS, and was originally released in 2007 for billing purposes. As such, it was never intended to be a central repository of water rights information. However, it has been adapted over the last fifteen years to allow users to search for water rights records and to file statements of water use and other required reports. While these functions are useful, they are incomplete. For example, water rights are not indexed or searchable by place of use (for more examples see Appendix C from Kiparsky et al 2021). In addition, because eWRIMS has been updated over time on an as-needed basis, it is far from comprehensive, with most records only able to be accessed as paper documents in the State Water Board Records Room. The UPWARD effort is focused on modernizing the eWRIMS system, by migrating it to a new platform, adding features, and converting paper records to digital formats that can be accessed online.

Core Features of a Modern Water Rights Data Management System

While the $30 million investment will be transformational, those resources will only go so far (as is the case for all information technology investments). In the initial system, the State Water Board will need to prioritize the most essential improvements. We were pleased to learn that stakeholder groups agreed on many of the following essential improvements or “core features.”

Core Features identified by this group include:

- User-friendly interface.

- Digital, searchable water rights records.
- Accurate information (e.g., data validation for annual water use reports).
- Ability to search by key water rights identifiers and other metadata.
- Ability to conduct geospatial searches for water right features based on user-selected areas or pre-defined areas (e.g., watersheds or watercourses).
- Ability to access water rights annual reporting data and metered data.
- Ability to integrate direct water measurements (e.g., real-time telemetry).

First and foremost, participants prioritized digitizing all paper water rights records since 2007. This was considered foundational to a more functional water rights data system. Secondly, participants agreed that digitization should be done using optical character recognition (OCR) to extract searchable and editable text. There was also input that the OCR could focus on a smaller set of fields (for example: permit number, license number, addresses, location information).

Participants emphasized that the accuracy of the data is also foundational. Thus, it will be important to validate self-reported water use data, which is subject to human error, moving forward. In addition, the data system should be able to accept direct water measurements, such as real-time telemetry.

Enhanced Features

Beyond these core features, participants identified multiple enhanced features that may be beyond the current budget but should be targeted for future phases of work. These include the ability to:

- Display geospatial watershed attributes, such as orders, emergency actions, and environmental/biological needs.
- Visualize trends at various scales (individual right, groups of rights, watersheds, etc.),
- Integrate external data sources, such as stream gage data.
- Automate customer service tools (emails, reminders, alerts).
- Provide education and learning opportunities (e.g., you used this much last year, similar properties are using this much).

- Reconcile records when importing eWRIMS data (conduct quality assurance and quality control on existing records).
- Provide real-time analysis of individual or grouped diverters impact by stream reach or watershed.
- Compare “reported” data to actual data.

Recommendations

While the dialogue series focused on elements of a water rights data management system, participants also discussed other concepts related to water rights data modernization. Based on this feedback and findings from participants in the dialogue series, the Water Foundation has developed some recommendations for the State Water Board as it deploys millions of dollars to transform the water rights data management system.

Communicate the value of the data. Potential users need to understand why water rights and diversion data that the state collects are needed and how they inform decision-making.

Engage with users. Different users need to understand how to interact with the new water rights system. Consider using different approaches to incorporate feedback from different users throughout the UPWARD project, such as holding public workshops or webinars to primarily educate and reach a larger, non-technical audience, combined with convening smaller groups of diverse stakeholders who are interested in engaging deeply on technical issues.

Meet with users where they are. Farmers and communities want the State Water Board to come see how they operate on the ground. This would highlight that agency’s important information sharing and gathering roles, not just enforcement. Similarly, the State Water Board could partner with organizations to identify and join local convenings and workshops where different audiences will already be in attendance.

Start simple and build with the future in mind. Consider limiting the initial scope to smoothly implement a few core features, while developing a plan to build out extended features over time. Create a flexible data system that is useful today and will support expanded functionality down the road.

Consider use cases. Set the system up to succeed by designing it with important use cases in mind. Design data entry interfaces—including the interface for water right reporting—to

maximize accuracy, minimize errors, and support effective system maintenance. Design search and analysis features to be effective and intuitive. Create guidance documents that explain how to use the system and which datasets and features may be useful to different categories of users.

Don't delay. It is critical that California make essential investments to fill data gaps now. Planning for the future is essential, and that means investment cannot be delayed. Build towards a robust system that incorporates real-time telemetry, is interoperable with other key datasets, and is able to withstand the challenges that our current system is unable to address.

Founded in 2011 and serving as an independent foundation since 2017, the Water Foundation has delivered nearly $70 million in new funding to the field, convened hundreds of diverse nonprofit, private, and community-based organizations, and worked with its partners to secure landmark policies to improve water management. Find more information at www.waterfdn.org.

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