(12/17/15) Public Workshop
Emergency Reg for Measuring & Reporting Diversions
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Comments to the State Water Resources Control Board on Emergency Regulation for Measuring and Reporting the Diversion of Water – December 17, 2015

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The PPIC Water Policy Center[2] and the UC Davis Center for Watershed Sciences are currently conducting a study of water information and accounting systems in 12 western states and three countries. As the State Water Board deliberates on the Draft Emergency Regulation for Measuring and Reporting on the Diversion of Water, it may be informative to consider successful measurement and reporting practices from other regions that face water scarcity. The suggestions offered below are adapted from practices employed by other state management entities with responsibilities and powers similar to those of the water board. We offer them to highlight potential opportunities for creating a more effective measurement and reporting program. We appreciate the opportunity to share preliminary findings of our research, and hope that these practices are useful considerations for the final measurement and reporting regulations.

Overview of preliminary findings: Best practices for measurement and reporting

Our preliminary findings suggest that regions actively using telemetric measurement technology, accounting for return flows, and developing public online access portals have stronger water accounting systems than regions that lack these tools. For example:

- Strategic use of telemetry-enabled monitoring networks provides a foundation for responsive water management and oversight. Colorado, some states in Australia, and major basins in Spain, for example, gather real-time measurements from reservoirs, gauges, diversions, and groundwater levels in one centralized accounting platform. They integrate real-time information into decision-making models to manage large water systems. This data collection technique offers the benefits of being instantaneously accessible and standardized, providing value to state oversight agencies, water users, and the public.

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- Measuring and accounting for return flows enhances the ability of state oversight agencies to address complex water allocation problems. Return flows can be measured directly (as with wastewater treatment plants) or estimated indirectly. In either case, state agencies gain a better understanding of water availability when they account for return flows. Statewide accounting systems for return flows are common in Colorado, Texas, and Nebraska, for example.

- Water diversion and use reporting is transitioning from hard copies to online platforms. Texas, Kansas, and Nevada, among others, are now implementing online water user reporting and phasing out hard-copy reporting. Digital reporting reduces the processing time and facilitates standardization and quality control across water user reports.

While some of these elements are already incorporated into the draft regulations, some additions may improve the proposed measurement and reporting program. Here we examine three topics: 1) surface water diversion reporting, 2) technology for measurement, and 3) identification of scarcity conditions.

Recommendation 1: Enhance the scope, quality, and utility of data collected from surface water diversion reporting.

- **Require surface water diversion and use reporters to provide information on consumptive use and irrigation practices.** Department of Water Resources estimates show that return flows are a major supply of stream flows and water use in many California basins. Detailed accounting for consumptive use is a nearly universal challenge among water managers and oversight agencies. In our study, only the Texas Commission on Environmental Quality directly asked every water user to report annual estimates of return flows. Depending on the type of water use, consumptive water use may be very difficult or costly to measure directly. Alternatively, consumptive use can be estimated indirectly using information that is easier for users to measure and report. For example, the Kansas Department of Agriculture estimates agricultural consumptive uses indirectly by requiring water reporters to provide annually updated information on irrigation practices like crop type, irrigated acreage, and irrigation method. These metrics can be used to indirectly estimate consumptive use of individual operations. Many regions in our study had fragmented or incomplete records of irrigation practices. While agricultural water right permit holders and licensees in California currently provide some of this information in annual reports, it would be valuable to consider collecting all of the metrics above and expanding this requirement to riparian and pre-1914 water rights not currently required to do so.[3] Recognizing that consumptive use estimates provided by

[3] Riparians and pre-1914 appropriators are required to fill out Initial Statements of Water Diversion and Use (once), and Supplemental Statements of Water Diversion and Use (annually, according to SB 88). In both reports, users must describe the "purpose(s) for which the water was diverted and used," but this doesn't consistently solicit a full characterization of irrigation practices.

user reporting will be lagged, these estimates still provide important information for evaluating water availability and allocation decisions, especially during droughts.

- **Establish quality control safeguards.** Safeguards can help state oversight agencies make the most of data collected from user reports. In Kansas, for example, each annual water user report is read by state staff, where it is compared to the face value of water rights and flagged if excessively high, very low, or missing information. State employees investigate low-quality reports through personal outreach. Water diversion and use reporters who believe that their report will be read and verified may be more likely to provide accurate information. Simple computer programming could be very helpful in performing initial user report validation. A sampling program could validate user reports at a relatively low cost.

- **Include a protocol for periodic independent auditing and program review.** Auditing contributes to the effectiveness of a measuring and reporting program. The draft regulations incorporate several auditing provisions such as requiring installation reports on water measuring devices and requiring clear access to water measuring devices for inspection by state agents. The water board also could include an auditing provision that provides for periodic program-wide auditing by an independent body of experts. The audit would assess key aspects of the program: from certification of accurate measurement devices and measurement and estimation methods to data post-processing and final dataset accuracy. The first step in implementing an auditing system is to define clear data reporting and post-processing standards, exemplified by the National Water Accounting Standards developed in Australia.

- **Consolidate reporting into a single template and orient the reporting deadline around the water year rather than the calendar year.** Consolidating the core water diversion and usage portions of the principal water user report types into a single basic template would streamline data collection and facilitate quality control. Supplemental information specific to reporting requirements under each report type may be accommodated as add-ons to the basic water use report template. This type of consolidation is currently being considered by state water oversight agencies in Texas. Shifting the 12-month measuring period to end in October and collecting self-reported water diversion and use data during the fall and winter would allow the water board to evaluate water demand in anticipation of water scarcity conditions and potential curtailments in the spring or summer of the following year. Other western regions with statewide water user reporting, like Washington and Oregon, collect water diversion and use reports in winter (reports due by January 31st and December 31st, respectively).

Recommendation 2: Consider the strategic use of telemetry in conjunction with responsive decision-making tools and procedures.

- **Implement an investment plan for real-time monitoring.** Taking full advantage of telemetry technology requires decision-making tools and procedures that effectively incorporate real-time data. Telemetry-enabled monitoring devices collect field measurements for use in real-time, creating a foundation for more responsive centralized data collection, analysis, and decision making. For example, Colorado has a network of telemetry-equipped monitoring devices measuring streamflow, groundwater levels, and major diversions. This network is the cornerstone of Colorado's centralized and real-time water management decision making models. Collecting accurate information on major diversions in real-time (somewhere between instantaneously and hourly) allows state water management to quickly and effectively model water management decisions at several spatial scales during times of scarcity and also indirectly measure water use using ancillary water balance models. To effectively implement an investment plan for a real-time monitoring system, we suggest identifying information gaps in priority areas—focusing on streams with large diversions and sensitive environmental areas.

Recommendation 3: Create standardized methods for anticipating scarcity and determining the need for more frequent reporting of diversion and use.

- **Prepare for more frequent monitoring in sensitive basins.** The new regulation will give the water board broader authority to require more frequent reporting by water users during times of scarcity. This provision builds on the water board's existing authority to issue orders requesting more frequent reporting from individual water users, as it has done in the current drought. Anticipating scarcity conditions on specific rivers and streams is a common challenge in the American west and other parts of the world in part because climatic and streamflow forecasts lack the accuracy to predict hydrologic scarcity at high resolution. Several regions are working to create forward-looking modeling tools for anticipating scarcity at high resolution, including Australia, Texas, and Nebraska. California has an opportunity to build on tools like the Drought Water Rights Allocation Tool (DWRAT) developed by researchers at the UC Davis Center for Watershed Sciences in collaboration with water board staff. DWRAT combines forecasted natural flows, estimated demand from water rights, and allocation priorities for right-holders, the environment, and public health into an evaluation of water supply availability at the sub-basin scale. Scarcity probabilities for individual rivers and streams could be regularly evaluated and ultimately classified to correspond with appropriate measuring and reporting requirements.