



# **COORDINATED WATER MEASUREMENT DATABASE**

Developed Pursuant to the Requirements of  
Chapter 675, Statutes of 2007

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State Water Resources Control Board

# **LEGISLATIVE REPORT**

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May 2009

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## **Executive Summary**

This report has been prepared in accordance with the requirements of Chapter 675, Statutes of 2007 (AB 1404, Laird). Chapter 675/2007 requires the State Water Resources Control Board (State Water Board), the Department of Water Resources (DWR), the Department of Public Health (DPH), and the California Bay-Delta Authority (CALFED) to prepare and submit a report to the Legislature evaluating the feasibility, estimated costs, and potential means of financing a coordinated statewide water measurement database. The law further requires that the collaborating agencies (1) evaluate how the database can provide information to address impacts related to climate change mitigation and adaptation and (2) consider collecting and sharing data through the use of technologies used by the National Environmental Information Exchange Network (NEIEN) and existing data exchange infrastructure of the collaborating agencies.

This report indicates that it is feasible to develop a centralized database. The study recommends development of a Centralized Statewide Water Use Database using a phased approach that calls for implementation of a Pilot Project that will focus on a limited number of water data providers. After the initial implementation of the Pilot Project, functionality would be expanded to process the agricultural water use and diversion data mandated by the law. The project team recommends that, rather than create separate governance models for different aspects of the state-level water resources management, it is more desirable to create an overarching governance model such as a Water Institute for Statewide Data Management (WISDM). The WISDM would be an organization that would direct and manage data from statewide water related programs such as those for the Chapter 750, Statutes of 2006, (SB 1070, Kehoe) and Chapter 675/2007 mandates. The project team also recommends that a statewide overarching governance model is needed to ensure the fulfillment of separate program mandates, and to ensure the critical coordination of program efforts and the establishment and assurance of a common vision and goals.

The proposed solution has an estimated one-time cost of approximately \$9.7M, and estimated continuing costs of \$2.1M annually. All one-time and on-going costs for the proposed solution are detailed in Section 8 of the attached FSR – Economic Analysis Worksheets.

## **Background Information**

To determine how to best use its statewide water supply, California needs to understand both how much water exists in the State and how much demand is or will be placed on those supplies. Compared to many other western States, current knowledge of these two issues in California is poor. Recent events related to the environmental collapse in the Sacramento-San Joaquin Delta demonstrated that the lack of adequate information can have a devastating effect on California's economic viability. Yet, there is a wealth of information on Delta water supplies and water uses compared to many other areas of the state. It is imperative that California's decision-makers gain a better understanding of how and where water is used statewide so that they can ensure that the constitutional mandate requiring that water be used both reasonably and beneficially can be achieved for the benefit of present and future residents, the health of the population, the health of our environment, and the health of our economy.

It was to this end that the Legislature enacted, and the Governor signed, Chapter 675/2007 requiring the State Water Board, in collaboration with DWR, DPH, and CALFED to prepare and submit a report to the Legislature evaluating the feasibility, estimated costs, and potential means of financing a coordinated statewide water measurement database. The Legislature further required that the agencies evaluate how the database can provide information to address impacts related to climate change mitigation and adaptation and to consider coordinating data through the collection and sharing of data through the use of technologies used by the NEIEN and existing data exchange infrastructure of the involved agencies.

### **Data Analysis**

As part of this FSR, the project team performed an initial review of the data and data types currently being collected and managed by the collaborating departments. Although the team did not conduct an in depth analysis, due to constraints on time, expertise and funding the team did perform a sufficient review to determine the resource requirements necessary to fully complete the necessary data analysis during system design, development and implementation phase if the Legislature provides direction and funding for the project to go forward. These resources and associated costs are detailed in Section 8 – Economic Analysis Worksheets of the attached FSR.

To address climate change under the current water rights system, the State will have to determine when to curtail water diversions if there is less water available than was available historically, when new water rights can be granted for proposed water supply projects because more water is available than was available historically, when and where there are opportunities for conservation and water reuse practices, and when voluntary water transfers can be made from those with a water allocation to those without an allocation without adverse environmental or third party impacts. All of these decisions require knowledge of how and where water is being used. Ultimately, it was determined that a coordinated statewide water measurement database, would provide much of the information necessary to address impacts related to climate change mitigation and adaptation, and given the poor state of current knowledge regarding water use within California, it is paramount that it be done.

In collaboration, the participating agencies concluded that at the present time, there is no comprehensive understanding of California's statewide water resource availability and use due to lack of available consolidated data accessible through a centralized reporting toolset. Because of this, it is not possible to obtain a clear state-level picture of California's available water supply, water diversions and use, and the potential effects of climate change on water resources.

The project team determined that a coordinated statewide water measurement database must provide not only a historical reporting capability, but also tools that support trend analysis, projections and data sharing on both a statewide and multi-departmental basis. The project team recommends that the collection and sharing of data for this statewide database should leverage existing technologies where possible. This includes the data exchange infrastructure of the participating agencies as well as those used by the NEIEN.

The participating agencies compiled the following information related to their current data and data systems.

**State Water Board** - The State Water Board collects data on water diversion amounts and water use amounts from the following entities: (1) those who hold water right permits, licenses, and registrations for surface water or groundwater associated with subterranean streams; (2) those who divert surface water under a claim of pre-1914 or riparian water right unless those users divert from a spring that does not flow off of their property, are in the Delta lowlands, or have an adjudicated right that is regulated by a DWR watermaster or the use under which is included in annual reports filed with the Water Board or a court; and (3) those who divert groundwater in an amount in excess of 25 acre-feet per year from lands in four southern California counties. The State Water Board collects information from water diverters only, not from the end-user unless the end user is also the diverter. The State Water Board does not collect water use information from end-users in situations where the water right holder contracts for water delivery to other users. For instance, the State Water Board collects diversion information from the DWR, which holds water right permits issued by the State Water Board, but does not collect use information from DWR's contractors or subcontractors. The State Water Board allows parties to estimate their diversion and use, if those amounts are not measured.

The State Water Board collects information by water right, not by entity. Those who hold more than one right must report on each right separately. Appropriative water rights are limited by the amount put to actual use and the rights can be lost if they are not exercised. The State Water Board uses its monitoring reports and other information as a means of determining how much water has been put to beneficial use, and the State Water Board limits the water right licenses it issues, to protect the beneficial use.

In most cases, users are required, as either a condition of their water right permit or license or by statute, to provide monthly diversion and use information. However, many water rights were issued decades ago and water measurement was not required. As a result, the State Water Board has allowed water right holders to estimate water use and has, in the past, allowed them to simply report that they diverted and used water without specifying the quantities. Often diversion rates and use are calculated based on land use data or are estimated by the user. Reporting frequencies vary, but most data is reported on a three-year basis, making the data less than useful for determining trends or making real-time decisions. Even though the Water Board has the authority to require the submission of data, it has little or no authority to take enforcement actions against those who fail to comply. As a result, only about 67 percent of permit and license holders actually report their use information and fewer than 35 percent of other water right claimants who are required to report their use actually do so.

Although the historical record of water rights is long, dating back to the date each water right was issued, data quality is poor. Further, water diversion and use information has not been converted into electronic form or entered into a database. Instead, it is submitted on paper forms in handwritten format. Each form is filed with the appropriate water right. The State of Kansas collects similar data from about half as many water right holders and expends about 4 staff years of effort each year to enter data into a database. The State Water Board is currently in the process of improving the functionality of its eWRIMS database to allow reporters to report

their diversion and use online. That functionality is anticipated to be available in July of 2009. When completed, State Water Board staff, water right holders, and the public will be able to view submitted reports online.

The State Water Board is strongly encouraging the other collaborating departments to do a similar inventory and analysis of their data and data systems should the Legislature provide direction and funding for the project to go forward.

**Department of Water Resources** - DWR is responsible for preparing the California Water Plan Update every five years. As part of that effort, the DWR collects water use information and annually surveys water data providers such as Public Water Authorities annually. The DWR sends out approximately 1,000 surveys and has had a 50 percent response rate. Participation in the survey is voluntary. The survey is sent in both letter and Excel file form. If the DWR is not satisfied with the survey response, then selected users are further contacted for response. DWR district offices contact, via telephone, some of the larger reporters to collect water diversion and delivery information. The follow-up contacts for the last survey resulted in an increase in the response rate to approximately 70 percent.

DWR periodically conducts industrial water use surveys. DWR purchases an industry list, and selects about 5,000 companies of the required size and in the targeted areas within the state. DWR sends a survey cover letter to the selected companies, which directs the companies to the website where the survey form can be downloaded. The survey requests water use by month and workforce levels by month.

DWR publishes the information it collects as the Bulletin 166 annual survey. There are currently many quality control issues with verifying and validating the data which is used in the 5-year California Water Plan Update.

**Department of Public Health** - DPH collects water use and water quality data from operators of public water systems. All of this information is required by federal, state and/or local law. The system operators submit annual reports using electronic forms. The data requested by DPH varies based on the size of the water system (number of connections), and by the type of system. A variety of information is requested on these forms, including engineering-related information. Electronic inventory data are submitted by the system operators via the counties to the DPH and are provided continuously.

There is an on-line library that contains water inventory and water quality information that can be queried by DPH staff. There are also internal and external reports produced for the federal government and the State, as well as ad hoc reporting capabilities. These reporting systems are also available on-line to the public. Standard reports are sent back to the data sources. There are also "validation of information" reports that are sent to the environmental health laboratories.

**Data Redundancies and Deficiencies** - It is imperative to understand that the collaborating agencies cannot simply assemble and report in electronic form on the data that they are currently collecting, if decision-makers want to use the information to inform decisions based on how and where California diverts and uses its water. Water from the northern-most areas of the

state flows to the southern-most areas of the state through a complicated series of engineering projects and legal water exchange agreements. If diverters and users were simply to report to a single database, some of the data would be "double counted" unless the relationships between the water diverters and the water users were clearly understood and accounted for in interpreting the database outputs. This is an important point from a policy perspective, in that a failure to recognize this critical point might lead to an uninformed decision built on incomplete or inaccurate information that could have catastrophic consequences for public health the environment and our already faltering economy.

### **Feasibility Analysis Result**

The project study group determined that it is feasible to develop a centralized database. However, much work will need to be done in order to realize the goals of Chapter 675/2007. There are currently no automated systems that collect and maintain data input by water diverters or users to the extent required to meet the goals of Chapter 675/2007. Currently, much of the data is submitted on paper forms, and only about 50 percent of the total water diversion and use data is submitted when requested by the appropriate state agencies. The water diverters and users' participation in collecting and submitting the data to the State agencies is mainly voluntary or where it is required, state agencies often don't have the authority to take enforcement action to compel the submittal of the data. As a result, much of the data required for statewide strategic and operational planning is not being submitted. Furthermore, although the data varies in quality, it is generally poor. In addition, some of the reporting periods are for multiple years, so that the data provided is several years old and may not relate to current water availability issues. The current level of available data is not a sufficient base of data to support the statewide planning and modeling requirements. Measures must be taken to improve the volume of submittals of the required water diversion and use data, and to improve the quality of the data. This is critical to fulfilling the Chapter 675/2007 centralized database goals.

The process used to determine the proposed solution included the assessment of several different alternatives for meeting the Chapter 675/2007 legislative requirements for the establishment of the database system. The alternatives assessed were:

- A Central Single Database Solution;
- A Low Functionality Solution; and
- The Water Institute for Statewide Data Management (WISDM) Phase I Solution, described below.

After researching and analyzing these alternatives, the project team recommends the WISDM Phase I Solution as the best solution to meet the Chapter 675/2007, State Water Board, DWR, CALFED and DPH business requirements. Analysis of the defined functional requirements against features provided by the other alternatives determined that the proposed solution meets 100 percent of the defined requirements. Section 5, Proposed Solution, of the attached FSR provides the detail of the proposed solution to implement the WISDM solution and the other alternatives that were analyzed.

The main features of the proposed solution are:

- A central, single web site for Water Data Providers (WDP) to use to input information.
- On-line forms compiled by an automated web forms processor based on the WDP type(s) associated with the user identification.
- When the WDP indicates completion of the requested data, and the data has passed the web forms processor validation rules checks, the data is processed.
- The demographic and cross reference data will be stored and managed in the central database.
- The water use and diversion data will be processed by the department responsible for collecting and maintaining it. This will require that the SWRCB, DWR and DPH have automated systems capable of accepting, storing, and managing the data routed to them by the web forms processor.
- A business intelligence toolset will be available to create and maintain standard reports as well as fulfill ad hoc requests and data extracts. This will also provide a “central database” view of the data by enabling the consolidation of water use and water diversion data from the SWRCB, DWR and DPH databases together with the central demographic data, based on the reporting, data extraction, and analysis requests. This consolidation ability will be flexible, so that other data sources can be included in the future, such as water quality and water availability data.
- The establishment of an independent Statewide Water Data Institute whose mission would be to direct and manage statewide water-related data such as the water use and diversion database.

The proposed system would include the data exchange infrastructure of the participating agencies as well as those used by the NEIEN. The data that would result from this system will provide essential information on water supply and water use that is critical for the State to know in order to develop effective strategies for water related climate change adaptation and mitigation.

### **Estimated Costs**

The proposed solution has an estimated one-time cost of approximately \$9.7 million, and estimated continuing costs of \$2.1 million annually. All one-time and on-going costs for the proposed solution are detailed in section 8 – economic analysis worksheets, of the attached FSR.

### **Funding Considerations**

One of the stated goals of AB 1404 was to fill critical agricultural water use data gaps and require state agencies to develop a coordinated water use database and to enable more effective water management planning and investment decisions at the state and regional level. Several sections of the bill also state the need for state level information, and a central reporting database to support planning.

As the legislation is mandating the creation of a system to support statewide water use and water diversion management and strategic planning, it is appropriate that this new program should be funded with either fees assessed to water diverters and users, or an independent funding source, or the General Fund. It could be reasonably argued that the system should be funded from fees to the extent that the need for the data system results from burdens imposed on a public resource from water diversions. However, given the State's current fiscal situation, other funding sources may also be appropriate and should be considered with the General Fund being the last choice.

### **Governance**

The State Water Board believes that it is appropriate and desirable to create an overarching governance model such as a statewide water data institute. This would be an independent organization whose mission would be to direct and manage statewide water-related data such as the water use and diversion database. The project team members agree that a statewide overarching governance model is needed to ensure the fulfillment of separate program mandates, and to ensure the critical coordination of program efforts and the establishment and assurance of a common vision and goals. The Water Board's Strategic Plan, approved in September 2008, and the State Water Board's Agency Information Management Strategy (AIMS), updated in March 2008, propose a similar governance structure for data management. The Little Hoover Commission, in its report "Clearer Structure, Cleaner Water" released in January 2009, as well as the California Water Quality Monitoring Council, mandated by Senate Bill 1070, all endorse the concept of a Water Data Institute.