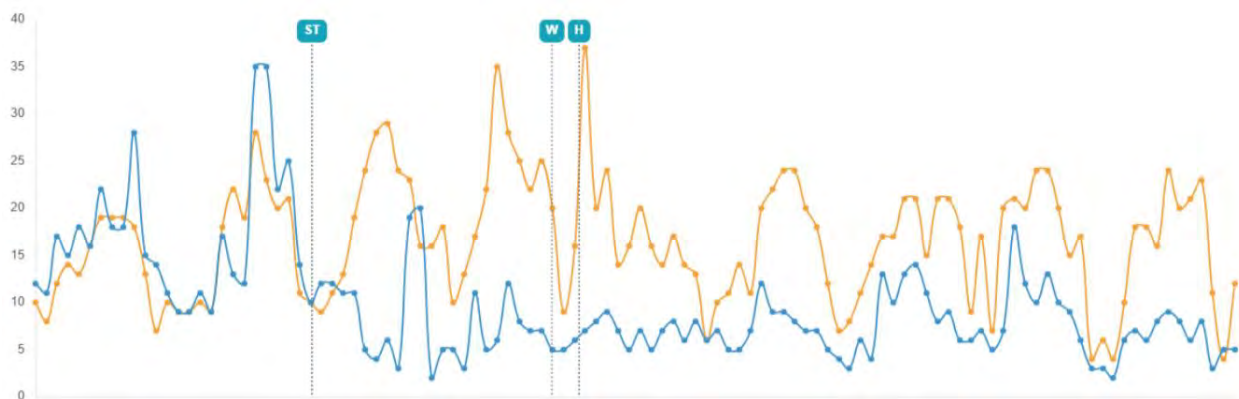


A Data Platform for Urban Water Efficiency in California

A Proposal to the U.S. Bureau of Reclamation, WaterSMART Applied Science (R21AS00289)

April 20, 2021



APPLICANT

California Data Collaborative

a fiscally sponsored project of Social and Environmental Entrepreneurs, Inc.

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TECHNICAL PROPOSAL AND EVALUATION CRITERIA

1. EXECUTIVE SUMMARY

DATE:

April 20, 2021

APPLICANT:

California Data Collaborative, a fiscally sponsored project of Social and Environmental Entrepreneurs, Inc.

23564 Calabasas Road Suite 201

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Los Angeles County

California Data Collaborative (CaDC) was founded in 2016 as a coalition of local water supply agencies in California. CaDC operates as a fiscally sponsored project of Social and Environmental Entrepreneurs (SEE), Inc. a 501(c)3 nonprofit organization. CaDC/SEE is a **Category B** applicant that works in close partnership with and is largely funded by annual dues from member agencies which are all Category A regional or local authorities with water delivery authority. CaDC/SEE's mission is to leverage community and technology to provide water suppliers with easy access to trustworthy data so they can make confident decisions.

Need: The 2012-2016 drought in California highlighted the criticality of having timely, accurate information about water production and demand to enable informed water demand management. In July 2014, the State of California responded to this need by adopting drought emergency water conservation regulations that required larger urban water suppliers to provide monthly water conservation and production reports. Then, in May 2018, then Governor Brown signed into law water efficiency legislation (Senate Bill 606 and Assembly Bill 1668) that established water use efficiency standards and authorized the State Water Board to require monthly water production, water use, or water conservation reports on a non-emergency basis¹. Implementation of this legislation is ongoing and will require local agencies to track and report on characteristics of their service area, such as irrigable landscapes, weather, population, and water demand of various end-use categories. Experience with other regulatory reports has shown that the status quo of fragmented reporting systems, ambiguous user interfaces, and competing standards means that local agencies will inevitably report data in an inconsistent and potentially inaccurate manner. Inconsistent data threatens the success of the entire water efficiency framework by complicating reliable and trustworthy demand management.

1

https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/water_conservation_reports/

Project: CaDC/SEE requests \$199,977.19 from WaterSMART to match \$200,000 from CaDC/SEE. CaDC/SEE proposes to partner with our member agencies to develop the California Urban Water Efficiency Data Platform (CUWEP), a software platform to assist local water suppliers with tracking, quality controlling, and analyzing their water production and demand data. The platform will help agencies evaluate their current efficiency levels, identify opportunities for improvement, share data for regional collaboration, and report their data for compliance with California’s water efficiency legislation. The software will be made accessible online using technologies common in modern consumer software. A free version of the software will be made accessible to all water suppliers who might benefit, while long-term operation and maintenance of the software will be supported by a paid “premium” version that offers advanced data analysis and visualizations. The CaDC will use matching funds and our statewide network of partners to conduct outreach promoting the benefits and encouraging adoption of the software.

This project will directly support WaterSMART management objectives to enhance water supply reliability, water efficiency, and drought management activities by improving the quality, availability, and usability of critical data for effective water demand management. This project meets the criteria for eligible project type, “Projects to improve access to and use of water resources data or to develop new types of data to inform water management decisions” from solicitation section C.3.1.

The project is expected to take 24 months, with a completion date of December 31, 2023. The project is not located on a federal facility.

2. TECHNICAL PROJECT DESCRIPTION

The CUWEP data platform will provide three core technical offerings:

- water data management
- integrated and streamlined data reporting
- data analysis and visualizations at free and paid premium subscription tiers

Free Water Data Management Web Platform for Water Suppliers. Despite the rapid advances made in many areas of consumer software in the last decade, many water suppliers in CA continue to manage mission-critical data on water production and water demand via paper records and/or spreadsheets that are manually shared between team members and internal departments. CUWEP will provide water agencies with a web-based software platform that will simplify everyday tasks of water management.

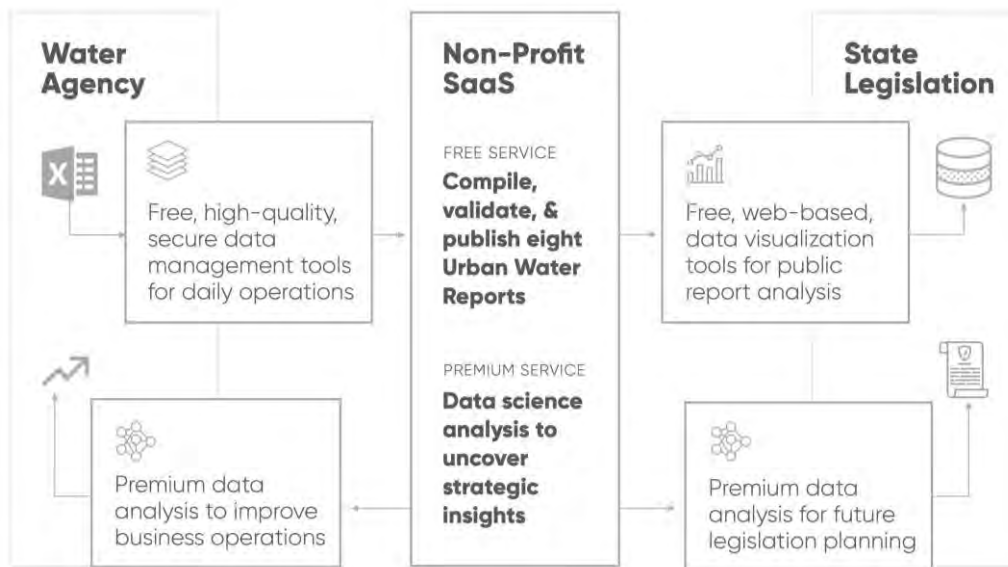


Figure 1. Diagram demonstrating the relationship of CUWEP ("Non-Profit SaaS") to local agencies and state regulatory agencies.

CUWEP will be available in two different tiers. The free tier will be available to all urban water suppliers for no cost to radically improve the current state of data management in the water sector, including for small water systems with limited budgets. System maintenance and expansion over time will be supported by a premium tier that will offer more advanced analysis and automation.

The free CUWEP water data management platform will provide basic water accounting features:

- Import available data via manual entry, spreadsheet upload, or other methods
- Add, verify, and reconcile production and demand measurements
- Segment data and allow for time series analysis
- Generate reports for internal reporting
- Export data for 3rd party analysis and visualization
- Prepare draft reporting documents aligned with key regulatory reports

The premium CUWEP subscription will offer more advanced data analysis and visualizations:

- Time series analysis of water consumption by customer category
- Filter and sort customer segments based on water usage profiles specific to geographic areas
- Compare the difference of targeted data segments filtered by time periods
- Generate a prioritized list of customers to target with conservation outreach
- Generate conservation impact reports that compare metrics before and after conservation actions to evaluate program effectiveness
- Trend analysis for future demand planning

- Tracking current position in relation to pending water use objectives under California's water efficiency framework with future-date, tiered conservation targets.

An Integrated Web Platform for Regulatory Reporting. The current process for water agencies to report data to the State of California is full of friction in the form of ambiguous definitions, poorly specified methods, and manual data entry that creates unnecessary opportunities for data entry problems and other human error. CUWEP will provide water agencies with a free reporting module that will aggregate public data relevant to regulatory reports, generate draft reports pre-formatted to State requirements, allow for collaborative team review of draft reports, with an end goal to enable "one-click" submission of final reports to the State. The State will receive reports from water agencies in their required format and seamlessly integrate with existing systems and processes.

Free Data Analysis and Visualization. CUWEP will enable fundamental data analysis and visualization of publicly disclosed data sets as a free offering to the general public. Fundamental analysis will allow water agencies to compare their performance to other agencies with similar characteristics and benchmark their performance within their local region or across the state.

Premium Advanced Data Analysis and Visualization. Currently, both water agencies and the State rely on 3rd party consultants to conduct advanced data analysis and visualizations at a premium price point. Consulting engagements often provide static deliverables that can only provide a point-in-time snapshot analysis and often need to be generated on an annual or semi-annual basis. CUWEP will provide a paid premium-level subscription that will enable water agencies and the State to conduct advanced data analysis and visualization via an intuitive, self-service web platform that can supplement current practices.

Data Ecosystem, Infrastructure, and API Development.

The infrastructure needed to develop a dynamic and relational data ecosystem will require data transfer APIs, automated data parsing, data standardization, data enrichment processes, and a high-speed relational time-series database with advanced data permissions, security, and export protocols.

Data Collection and Transfer. Given the variety of methods currently being used for data collection within agencies, including paper forms, spreadsheets, and databases, CUWEP will need to flexibly support different methods for data import. For water agencies operating primarily on paper data records, CUWEP will allow manual data entry, and the CaDC will explore the possibility of optical character recognition (OCR) technology to import data. For water agencies operating primarily on digital data records, data transfers via spreadsheet upload, API integration, or 3rd party data platform connections will allow more automated import.

Data Parsing, Standardization, and Enrichment. CUWEP will parse data from each water agency to convert their raw data according to open source data standards. The CUWEP

platform will then enrich the standardized data with additional attributes relevant for demand management and reporting, such as landscape area at the parcel level, local environmental conditions, and sociodemographics.

High-Speed, Relational, Time-Series Database. CUWEP will then import standardized and enriched data into a high-speed, relational, time-series database that will enable querying and analyzing large volumes of water production and demand data for interactive decision support.

Data Ownership, Permissions, and Security Protocols. CUWEP will implement robust security protocols to protect personally identifiable information about water customers. CUWEP will offer agencies the highest level of control of how their data is accessed, and shared. Water agencies will retain complete and total ownership of their data and will be able to manage data permissions at all levels of the CUWEP platform.

Open Data Standards and Methods.

When reporting information to the State, each local supplier typically uses bespoke calculation methodologies to determine various metrics such as population, gallons per capita per day (GPCD), and evapotranspiration adjustment factor (ETAF). To support more accurate reporting and intercomparison, the CaDC will establish a set of open data standards and methodologies that agencies can select from within CUWEP.

Data Export. In the spirit of enabling water agencies to retain complete ownership and control of their data, a robust data export feature will allow agencies to export a complete package of their standardized historical data as well as targeted data segments to be made available for additional analysis via 3rd party consultants, analytics tools, and data platforms.

3. PROJECT LOCATION

The project location spans areas across the state of California, with a primary focus on areas served by Urban Retail Water Suppliers (URWS), defined by the California Water Code as water suppliers, either publicly or privately owned, that directly provide potable municipal water to more than 3,000 end-users or that supply more than 3,000 acre-feet of potable water annually at retail for municipal purposes. A secondary focus will be on areas served by Urban Wholesale Water Suppliers (UWWS), defined as water suppliers, either publicly or privately owned, that provide more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes.

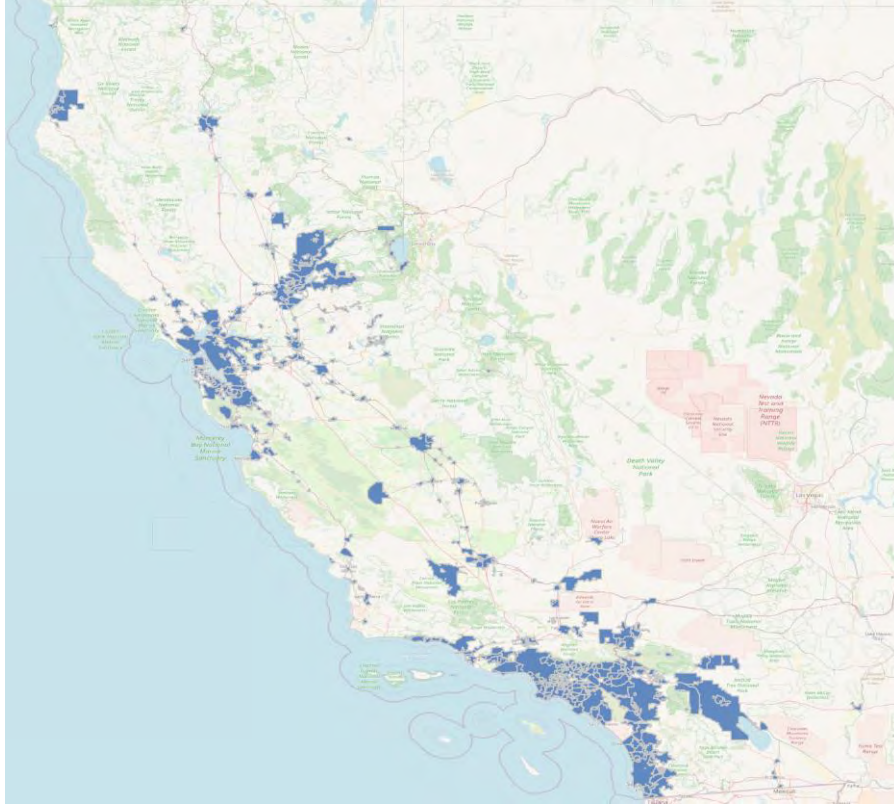


Figure 2. Areas shown in blue are served by urban retail water suppliers in California.

4. Data Management Practices

Data will be obtained directly from users of the software (employees of water agencies) as well as from public data sources. CaDC will protect any data obtained from water agencies under an appropriate data use and nondisclosure agreement. Data sharing with regional partners or state agencies will occur only at the discretion of the data owner and in compliance with the data use and nondisclosure agreement.

CUWEP will store data on Amazon Web Services, which offers solutions for file object storage and relational databases. Any data storage solutions used will be secured using password protection, network firewalls, and encryption where appropriate to prevent unwanted data access. The CaDC will review security procedures and network configurations annually to ensure that they stay up to date. Spatial data used in the tool, such as meter, parcel, and agency boundary locations, will be accessible in industry-standard formats compatible with Geographic Information System (GIS) platforms.

5. Evaluation Criteria

5.1 Evaluation Criterion A — Benefits to Water Supply Reliability (40 points)

Water Management Issues Addressed. Drought and water scarcity are a perennial challenge in California water management, and as the planet warms and the climate changes, these challenges are forecast to intensify. Increasing variability in precipitation levels is likely to bring more frequent and more severe droughts punctuated by periods of heavy precipitation. Already in 2021, moderate to severe drought grips much of the western US, with impacts both within California as well as on watersheds that supply the state, such as the Colorado River, which has seen the driest period in recorded history during the last 10 years and is likely to face a tier 1 shortage this year.

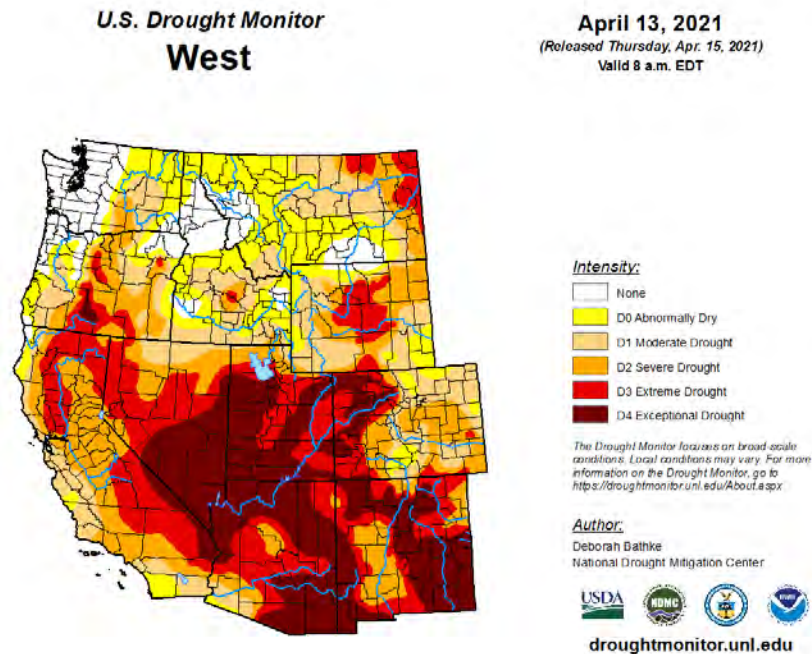


Figure 3. Status of the U.S. Drought Monitor as of April 13, 2021

This looming drought follows on the heels of California’s extreme 2012-2016 drought, which saw the state issue its first-ever mandatory restrictions on water use along with a cascade of regulation, legislation, and monitoring designed to aid water management through the drought as well as with preparation for future droughts. This included a variety of actions, including:

- In July 2014, the State Water Board adopted a drought emergency water conservation regulation requiring the state’s urban retail water suppliers to provide the Board monthly water conservation and production reports.

- In 2015, SB 555 required urban retail water suppliers to submit water loss audits to the State by October 1, each year.
- The State Water Board added questions regarding water supplies, deliveries, and conservation actions to the electronic annual report required of urban water suppliers.
- In May 2018, Governor Brown signed into law water efficiency legislation (Senate Bill 606 and Assembly Bill 1668). This legislation created water use efficiency standards and authorized the State Water Board to require monthly water production, water use, or water conservation reports on a non-emergency basis.

The realities of drought in California have thus moved the State into a position of regulating the volume of water that can be sold at the local level as well as requiring extensive data collection and reporting to monitor and effectively manage water demand. These unfunded mandates have in turn created a new imperative for local water suppliers to closely monitor the water demand and efficiency of customers in their service areas so that they can actively invest in the most impactful water efficiency programs that help them meet efficiency standards while reporting accurate information to the State about local water demand conditions.

In the face of this new imperative for data-informed demand management, many local water suppliers remain unprepared. They often lack the tools and skills to implement the robust accounting of demand and efficiency required to satisfy state reporting requirements accurately, let alone to comply with pending water efficiency standards. Many suppliers continue to track critical data about water production and demand on paper forms or in spreadsheet programs that are untenable at best. Those with access to more sophisticated software often find their data locked away in legacy systems that provide no flexibility to adapt to new processes or changing water management realities.

This lack of an appropriate system for managing and analyzing water production and demand data that meets the needs of local suppliers and the State has real consequences for water supply reliability in California. At the local level, when agencies are unable to leverage their demand data to evaluate and prioritize water efficiency investments, they run the risk of funding programs that are not a good fit for their service area or spending money marketing to customers who are already efficient, leading to lower than expected levels of water savings and a subpar return on their investment. This, in turn, increases the cost of complying with efficiency standards and, more generally, transitioning water use patterns to more efficient levels to cope with a changing climate.

Difficulty accessing and leveraging production and demand data also leads to a high cost of summarizing and reporting data to other entities such as the State. A 2019 survey and analysis by the CaDC estimated a total annual cost to California's urban water suppliers of more than \$4 million to compile, format, and submit just three common regulatory reports (see Appendix A1). These three reports are only a subset of the many ways that production and demand data are commonly reported, so the true cost of data reporting is likely much higher. Furthermore, a data management and reporting process that is manual and specific for each supplier is also likely to be error-prone, leading to lower data quality for regulatory agencies. Research by the CaDC has

found common errors in reported data such as abrupt changes in population, incorrectly classified water use, and other issues commonly caused by conflicting definitions and the poor user experience of reporting platforms. These data errors have profound implications when the data are used to inform regulatory decision-making, as is the case right now in California as the CA DWR seeks to determine appropriate efficiency standards for water use.

How This Project Will Support Management Issues. Our project will create a software platform that improves access to and usability of water production and demand data collected by local water suppliers. Using CUWEP, local water suppliers can more easily manage, analyze, and share their own data to help them meet key water management objectives such as water supply reliability, management of water deliveries, drought management activities, conjunctive use of ground and surface water, as well as conservation and efficiency. Specifically, our project will support:

Water Supply Reliability: CUWEP will support water supply reliability by equipping water managers with tools designed to allow targeted action to reduce demands. By increasing the effectiveness of water conservation and efficiency as a management action, water suppliers will have greater flexibility to match demand levels to available supply, with the result being an increase in water supply reliability. By providing insights into the water demand behavior or their customers, the relationship between water production and demand, and by offering streamlined reporting of data, water suppliers will be able to use CUWEP to reduce water loss, coordinate with partners and regulators, and encourage the efficient use of water during both drought and non-drought periods.

Management of Water Deliveries: At the local level, distribution system water loss through leaks can constitute a substantial fraction of total system water use. In California, between 0% and 12% of real losses are typical, with an average of 7% reported across all water loss audits reported to DWR between 2017 and April 2021². Under California’s new water efficiency framework, urban water suppliers will be required to meet water loss performance standards currently in development. A single data system for both water production data and water demand data will help facilitate timely analysis of system water losses to help optimize water deliveries in local distribution systems while simplifying regulatory reporting of water loss.

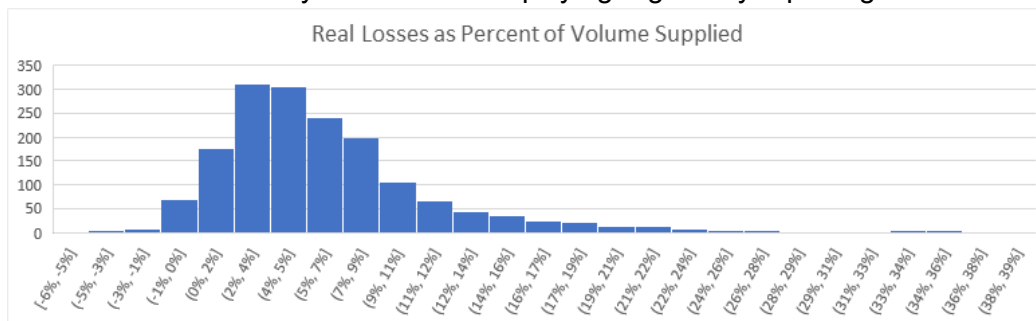


Figure 4. Histogram of reported real water loss as a percentage of all water supplied for all water loss audits reported to CA DWR between 2017 and April 2021

² https://wuedata.water.ca.gov/awwa_export

Drought Management Activities: Timely and accurate demand management is critical during extended droughts when water managers must stretch water supplies to ensure the continued reliability of the water system. CUWEP will be a data management and analysis platform tailored to support more effective demand management during all time periods by enabling targeted outreach to inefficient water users, evaluating water efficiency program effectiveness, and customer segmentation for accurate program planning. CUWEP will align with agencies' water shortage contingency plans (required in California) by supporting common actions taken during a water shortage. For example:

- During water shortages, agencies with allocation-based rates often compress the upper pricing tiers to increase the cost of water use above an efficient threshold. CUWEP can support these agencies by offering targeted outreach to customers in higher pricing tiers.
- During severe water shortages, outdoor irrigation may be curtailed through a number of approaches. CUWEP can offer identification of and outreach to customers that are heavy irrigators by finding seasonal trends in water demand.
- During water shortages, agencies may impose deadlines on when leaks need to be repaired. CUWEP can identify customers with increasing trends in water demand who may have unrepaired leaks.

Conjunctive Use of Ground and Surface Water: Conjunctive use often requires close collaboration between local water suppliers and groundwater management agencies. CUWEP will strengthen this collaboration by making it easier for local suppliers to report the volume of extractions they make during a specific time period. By building data quality checks into all levels of the system (for example, to detect typos or periods of unmetered extraction), CUWEP will make this reporting easier and ensure its accuracy, allowing for more robust groundwater balance calculations.

Conservation and Efficiency: Water efficiency is increasingly a way of life in California. Many existing water sources are already over-allocated so that, in the absence of radical new water sources such as cheap desalination, most future economic and population growth must be supported through increases in efficiency rather than new supply development. The passage of SB606/AB1668 has written this reality into state law, with gradual increases in efficiency mandated over the next decade. CUWEP aims to equip water managers, particularly water efficiency professionals, with the software tools they will need to plan for, and achieve these new levels of efficiency. Key features of the platform that will support this goal are:

- The ability to identify and target key customer subsets of interest for water demand management, such as heavy irrigators, inefficient water users, as well as rebate program participants (and non-participants).
- The ability to monitor the effectiveness of demand management measures by tracking the water use of customer subsets over time and estimating the water saved by measures like device rebates.
- Features designed to guide users through compliance and reporting aligned with California's SB606/AB1668 water efficiency framework by calculating the water use

objectives that agencies need to meet and track metered water use against the water use objective.

Magnitude of Project Benefits. During drought periods, local water suppliers in California invest many millions of dollars in rebates, education, research, and advertising to keep demands low. The Metropolitan Water District of Southern California alone invested \$41 million³ into efficiency in the fiscal year 2016/17. Even minor improvements in the cost-effectiveness of the programs offered by suppliers can therefore have huge benefits. CUWEP will support this increased cost-effectiveness in several ways. First, CUWEP will allow regular evaluation of program effectiveness by monitoring water saved and customer participation on a monthly basis. By viewing the relative effectiveness of different programs, water managers can redirect resources from underperforming programs to those that are meeting or exceeding expectations. Second, CUWEP will allow targeted outreach to customer segments where programs can achieve higher expected returns. Research by the CaDC⁴ has shown that customer characteristics can influence the volume of water saved by a water efficiency intervention. For example, both less efficient customers and those in hotter, drier areas saved more water per square foot than their counterparts after receiving a turf replacement rebate.

In addition to direct benefits on water saved, CUWEP will realize indirect benefits by reducing staff time and resources spent on regulatory reporting. If the \$4 million in annual reporting costs estimated in appendix A1 are taken as a conservative lower bound on the overall cost of reporting involving water production and demand data, and assuming that 50% (175) of the suppliers used in the A1 calculation decide to use CUWEP which reduces their reporting burden by 20% each, then CUWEP can be expected to provide at least \$400,000 annually in benefits to California's water suppliers. This is believed to be a conservative estimate because the actual cost to local suppliers of data reporting across all reports is likely much higher and because other software tools created by the CaDC have seen staff burdens drop by much higher percentages. For example, a software tool created for the Moulton Niguel Water District helped reduce the time their staff spends on processing bill adjustment applications by 80%. In addition to the direct benefits for local suppliers, CUWEP's data quality checks will reduce the frequency of reporting errors and thereby reduce the effort expended by state water agencies to quality control the reported data they receive. While we cannot predict how water managers will use the savings from these avoided costs, they will undoubtedly be applied toward achieving primary water management objectives such as improved reliability and efficiency.

Unlike a one-time study, CUWEP will be a living software platform that grows in functionality over time, increasing benefits as new capabilities are added. This is similar to the way that many consumer web applications operate. Both platform maintenance and future improvements will be funded by paid subscriptions that grant access to the higher tier of CUWEP functionality.

³ http://www.mwdh2o.com/pdf_about_your_water/2.1.1_regional_progress_reportsb60.pdf

⁴ <https://arxiv.org/pdf/1708.02395.pdf>

Complementarity with Similar Efforts. The work most directly relevant to CUWEP is the CaDC's own prior work developing the CaDC Analytics software tool. CaDC Analytics is a software-as-a-service web application provided by the CaDC to our member agencies. Many of the ideas presented in this grant application have already been piloted in CaDC Analytics. CUWEP is imagined as a successor to CaDC Analytics and would benefit from the years of learning and years of previous financial investment by CaDC member agencies toward creating a data engineering platform and a standardized cross-agency database of water demand and water efficiency data. This previous investment dramatically reduces the risk of further development because the user need and technical approaches have already been thoroughly validated. Funding from the USBR will allow several current gaps in the functionality of CaDC Analytics to be filled while also expanding the system to align with the technical specifications and reporting requirements of California's water efficiency framework.

There are other related efforts to this project underway throughout California and beyond, but the CUWEP project fills a unique niche. These related efforts are described below:

- The California Water Data Consortium⁵ (CWDC) is a newly formed nonprofit organization with the mandate of helping to realize California's 2016 Open and Transparent Water Data Act. While the CaDC is connected to, and involved in, the actions of the CWDC, the CaDC brings a focus and dedication on the needs of local suppliers that complements the statewide perspective of the CWDC.
- The Alliance for Water Efficiency has built and maintained a tool called the Water Conservation Tracking Tool⁶. CUWEP is very much aligned with the spirit of the Tracking Tool, though CUWEP has a different focus and an alternative software model. The Tracking Tool is a Microsoft Excel spreadsheet-based tool to evaluate the water savings, costs, and benefits of conservation programs for a specific water utility. The water savings in the tracking tool are based on established research and industry standards. In contrast, CUWEP will be a modern browser-based software application with a more operational than planning focus. By utilizing each agency's water demand and rebate data, water savings can be calculated on a customized basis instead of relying on industry norms.
- A number of private companies, such as WaterSmart Software, offer browser-based software-as-a-service applications. While the ability to view water demand trends and segment customers may be similar to the functionality proposed here, several items set CUWEP apart. The most important of these is that, as a nonprofit governed by local water suppliers, the CaDC can act as an extension of the water management community rather than as a vendor. This allows for greater trust, lower cost, and deep integration with the specifics of state regulations. Furthermore, CUWEP's primary position as a decision support and reporting platform for water managers complements the customer-facing portals that many private software companies provide.

⁵ <https://cawaterdata.org/>

⁶ <https://www.allianceforwaterefficiency.org/resources/topic/water-conservation-tracking-tool>

5.2 Evaluation Criterion B — Need for Project and Applicability of Project Results (20 points)

Ready Applicability of Applied Science Tools. CUWEP will serve the needs of water resource managers at several different levels in the water system. Local water retailers will benefit from tools and analyses supporting operational decision-making and data sharing. Local and regional water wholesalers will benefit from the ability to access aggregated and anonymized data from the retail agencies they serve. State water agencies will benefit from improved quality of regulatory reporting data. Legislators will benefit indirectly from the policy analysis that will be made possible through the increased availability of timely, accurate, and verifiable data.

Expressed Need. The direct motivation for CUWEP arises from the expressed needs of hundreds of water managers at all levels of California’s water system, starting with the formation of the CaDC in 2016. Since that time, the development of data science tools to support water efficiency within local water supply agencies has been a priority of CaDC’s member agencies. Since 2018, the CaDC Steering Committee, a supervisory body composed of staff representatives from each CaDC member agency, has also listed streamlining of regulatory reporting to be a top priority. As supporting evidence, the CaDC scopes of work for previous years, beginning with the original CaDC memorandum of understanding, are provided in the appendix.

The need for systems like CUWEP has also been expressed at the legislative levels. California Assembly Bill 1755 (2016) recognized the importance of data integration and open-source tools to “help water managers operate California’s water system more effectively and help water users make informed decisions based on water availability and allocation”⁷. AB1668 (2018) instructs that “[t]he state should identify opportunities for streamlined reporting, eliminate redundant data submissions, and incentivize open access to data collected by urban and agricultural water suppliers.”⁸

Independently of the CaDC, Abe Serrano of Water UX, as part of a fellowship with the organization E2, conducted interviews with water managers throughout the state to assess desires and needs related to SB606/AB1668. These interviews demonstrated a number of limitations of the current ecosystem for water data reporting, and Abe presented the findings before the CaDC Steering Committee in January 2020. This presentation is provided in the appendix.

Most recently, in 2021, the CaDC developed a rapid assessment to quality control Landscape Area Measurement (LAM) data being provided to urban water retailers by California DWR as part of the implementation of SB606/AB1668. Inaccuracies have proven common in the LAM data. Identifying these inaccuracies has involved overlaying the state-provided data with utility

⁷ https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB1755

⁸ https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB1668

data to generate a complete image of water use and efficiency in a supplier's service area. This assessment has been conducted for 10 water suppliers to date, with high interest among others. The desire for this data assessment service further validates the need for tools and data analysis to aid water suppliers in understanding and complying with water efficiency legislation.

Immediate Applicability. Tools and information to inform water resource management actions will be accessible immediately upon completion of the project. Additional future work beyond the scope of this application is expected to continue to increase the utility and water management benefits of CUWEP. Still, this additional work is not necessary to inform decisions immediately.

Transferability. Certain aspects of CUWEP are expected to be transferable across the United States (or even beyond). In any situation where local water suppliers need to analyze and share water production and demand data to inform demand management and resources planning, portions of CUWEPs functionality will be applicable. That said, part of the value proposition of CUWEP is deep integration with the regulatory environment in California, and no plans are currently being made to develop two different versions of CUWEP (e.g., inside and outside of California). Any additional work needed to develop this is outside the scope of this application and would need to happen in the future.

Collaboration with Primary Beneficiaries. The project beneficiaries mentioned above (water retailers, wholesalers, regulators, etc.) will be involved in planning primarily through the CaDC's committee structure and secondarily through extensive interviews and outreach through partner organizations described in sections 5.3 and 5.4.

5.3 Evaluation Criterion C — Project Implementation (20 points)

The CUWEP, as proposed, is grounded in the daily problems and real needs of water managers at the local and regional levels. To ensure that this focus on user needs remains central throughout project implementation, a human-centered approach and a Lean UX methodology will be employed to implement functionality in minimum viable increments while measuring results. In this way, hypotheses about how best to implement requirements can be quickly validated and previously undiscovered needs can be brought to life sooner in the project lifecycle.

To enable comprehensive testing and validation, we will recruit a diverse pool of stakeholders representing a cross-section of user personas and archetypes of CUWEP end users. These stakeholders will be deeply integrated into our design and development process to offer early validation of core features, contribute their subject matter expertise to test prototypes, and provide contextual feedback based on their needs and special circumstances.

Our process will be highly iterative and follow an agile "design-build-test" software development methodology. Milestones will be strategically planned to systematically lower the risk of ambiguity, remove obstacles, and increase the odds of CUWEP succeeding upon public

deployment. Our process will leverage open-source software development frameworks, libraries, and best practices. By leveraging open-source software, CUWEP will be better positioned to scale, benefit from a robust open-source development community, and benefit from the progressive enhancements to the code base.

We believe that the unique combination of a human-centered approach, a lean UX methodology, and open-source development tools will enable CUWEP to become an industry standard and viable tool for water managers across the state of California.

Project Phases & Segments

The project phases are described below, including the timeframe of the phase and the tasks that will be accomplished in each phase. For a full description of each task, please refer to Section 8.3 Budget Narrative. The timeframes listed below assume a start date of January 1, 2022. Any delay in the start date of the project, for example, due to delayed availability of funds, will delay each phase by a corresponding amount of time.



Figure 5. CUWEP product roadmap.

Phase 1: Proof of Concept (3 months: January – March 2022)

Phase 1 is focused on clarifying user workflows and developing an initial, low-fidelity design prototype. Initial work on planning the data infrastructure can also begin at this time.

Tasks:

- Data strategy, architecture, and infrastructure planning
- UX strategy, data mapping, and user workflows
- Design, test, and iterate low-fidelity prototype

Phase 2: Minimum Viable Product (6 months: April – September 2022)

Phase 2 will culminate in the creation of a “minimum viable product” (MVP). The MVP will be an end-to-end working version of CUWEP with a greatly reduced feature set created to gather feedback and test assumptions under more realistic user scenarios.

Tasks:

- Develop, test, and iterate high-fidelity web application
- Code review, user tasks QA, and system stress-testing
- Merge code, go-live, and monitor for performance

Phase 3: Pilot Programs (6 months: October 2022 – March 2023)

Phase 3 will be focused on getting pilot programs into place with agencies across the state to test the capability and utility of the MVP.

Tasks:

- Partner with CalWEP to recruit water agencies for pilot programs
- Facilitate pilot programs and gather user feedback

Phase 4: Progressive Expansion (6 months: April – September 2023)

Based on feedback from the pilot programs, Phase 4 will see the prioritization and implementation of progressive enhancements to CUWEP.

Tasks:

- Prioritize feedback, optimize roadmap, and launch progressive enhancements

Phase 5: Full Rollout & Scale (3 months: October – December 2023)

Phase 5 will involve scaling the finished product to as many agencies as possible.

Tasks:

- Deploy code base for public release
- Implement dissemination campaign across conferences, webinars, & professional networks
- Onboard water agencies

Anticipated Products

The primary product resulting from this project will be the CUWEP software deployed and publicly accessible to qualifying users. The table below provides an abridged list of the features of CUWEP. Please reference “Project Technical Description” for a full description of final product outputs.

Product	Description
Free water data management web platform for water agencies	CUWEP will provide water agencies with a free web platform that will automate the common tasks of water data management.
An integrated reporting web platform and API	CUWEP will provide water agencies with a free reporting module that will aggregate public data relevant to regulatory reports, generate draft reports pre-formatted to State requirements, allow for collaborative team review of draft reports, with an end goal to enable "one-click" submission of final reports to the State.
Free basic data analysis and visualization	CUWEP will enable basic data analysis and visualization of publicly reported data sets as a free offering to the general public.
Premium advanced data analysis and visualizations	The premium CUWEP subscription will offer advanced data analysis and visualizations.
Data Ecosystem, Infrastructure, and API Endpoints	<ul style="list-style-type: none"> ● Data Collection and Transfer ● Data parsing, standardization, and enrichment ● High-speed, relational, time-series database ● Data ownership, permissions, and security protocols ● Open-source data standard and conversion model ● Data Export

Key Personnel Credentials and Experience

Christopher Tull

Project Manager & Systems Architect

Christopher Tull is a public technologist, nonprofit leader, and data systems architect specializing in data storage and analytic solutions to support local governments. He has served

as the lead data systems architect with the California Data Collaborative, where he designed and built data infrastructure to process, store, and analyze metered water use data from water utilities across California, including hourly AMI data. Prior to that, he worked in the Urban Intelligence Lab at New York University, where he developed the official energy benchmarking analysis website for the City of New York and forecast energy use for all 1.1 million buildings in NYC. His award-winning work has been recognized by Bloomberg and the State of California, and has been published in peer-reviewed journals as well as top industry conferences. He has an M.S. in Urban Informatics from New York University and a B.S. in Computer Science and Mathematics from CSU Channel Islands.

California Data Collaborative

Project Principal

For five years, the California Data Collaborative (CaDC) has brought together tech-forward water utilities to invest in the design and development of open-source data analysis software tools that inform its member agencies' operational decisions. The CaDC's commitment to open-source software design and development results in scalable and cost-effective data tools that allow member agencies to quantify the value of their water-efficiency programs and develop targeted customer outreach and conservation marketing campaigns. Powered by industry professionals and expert technologists, the CaDC sees data and technology as a tool to realize a more reliable, resilient, and sustainable future.

Abe Serrano

Director of User Experience & Product Manager

Abe Serrano is the Director of User Experience for Water UX and positions himself at the convergence of business, design, and technology to simplify challenges, identify innovation opportunities, and design data solutions within water-related sectors.

Abe is a strategic leader with a human-centered design approach, a lean User Experience (UX) methodology, and a thoughtful approach to User Interface (UI) design systems. With 14 years of industry experience, Abe has had the opportunity to lead digital transformation initiatives for Fortune 100 companies, acted as an advisor for startups within the Los Angeles Cleantech Incubator network, and was recently a 2019 E2 Fellow. His latest initiatives focus on streamlined data reporting, advanced data analysis reports and visualizations, and developing the future of water data management for state regulators and local water utilities.

Water UX, Inc.

Subconsultant

Water UX, Inc. specializes in human-centered data solutions for water innovation. With the rise of available data within the water sector, Water UX, Inc. partners with public and private water utilities to translate available data into analysis tools and visualization dashboards that provide actionable insights. With a world-class design and development team, Water UX delivers data technology solutions that are standards-compliant, modular, and scalable.

With 20 years of collective experience, Water UX, Inc. offers a process that is informed by the evaluation of complex data systems, identifying strategic innovation opportunities, and defining a clear pathway to achieve desired business objectives. As advocates for the end data user, Water UX, Inc. delivers intuitive and modern solutions that scale to meet evolving needs. By providing a better data experience, Water UX, Inc. empowers water utilities to improve their customer service, make informed policy decisions, and strategically plan for future challenges.

Specialty Roles

Water UX, Inc will provide and manage the specialty roles of a Data Engineer, Backend Developer, Frontend Developer, and a UX/UI Designer. Water UX, Inc manages an extensive network of pre-qualified specialized talent for each specified role and can fill and onboard the roles within a weeks notice

No Project Delay

The project team can proceed with the proposed project immediately upon entering into a financial assistance agreement with no delay.

5.4 Evaluation Criterion D — Dissemination of Results (10 Points)

CUWEP will become the flagship product for the CaDC with the core offering of a water data management platform, integrated streamlined reporting, and basic data analysis and visualization provided as a free subscription to water agencies. A paid premium subscription will grant water agencies access to advanced data analysis and visualization tools for trend analysis, future demand planning, and targeted customer conservation outreach. As such, the CaDC is highly invested in the success and widespread adoption of CUWEP.

Once the proof of concept phase has been completed, the CaDC will continue to lean on the expertise of CaDC member agencies while also working with the California Water Efficiency Partnership (CalWEP) to recruit water agencies to establish CUWEP pilot programs across the State of California. The CaDC will share pilot program status updates monthly via public blog posts, social media, and newsletters.

Once a public release is available, CUWEP will be immediately disseminated to agencies that provided feedback as stakeholders, agencies that participated in pilot programs, and CaDC member agencies. The CaDC will implement a campaign to promote CUWEP on the CaDC website and through webinars, podcasts, online video channels, conferences, and water professional networks such as the CA Water Data Summit, CalWEP Peer to Peer, WaterSmart Innovations, ACWA Conferences, and The Stream with Will & Tom.

As CUWEP gains public awareness and traction, the CaDC will continue to invest in the promotion of the core product offering and prioritize the expansion of the product roadmap to meet the future needs of water agencies.

6. Environmental and Cultural Resources Compliance (as applicable to the project)

The CUWEP will be a software program accessible on the internet, and its development will not involve any earth disturbing work or impacts on the environment. No listed or proposed endangered species will be affected by development of the CUWEP. No wetlands or surface waters will be impacted by the software development. No water delivery systems or irrigation systems will be constructed, modified, or affected as part of the work proposed in this project. There are no irrigation districts associated with this project; thus none are listed or eligible for listing on the National Register of Historic Places. There are archaeological sites within California, but no physical impacts from CUWEP development are anticipated. Similarly, the development of the CUWEP will have no impact on low-income or minority populations. This project will not limit access or use of Indian sacred sites or tribal lands. The CUWEP will not contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species.

7. Required Permits or Approvals

No permits or approvals are required for the development of the CUWEP because it is a software tool. The CaDC will obtain permission to access and use any non-public data required for the functioning of the tool through appropriate data use agreements with the relevant entities.

8. Project Budget

8.1 Funding Plan and Letters of Funding Commitment

The non-federal share of the project cost will be contributed by Social and Environmental Entrepreneurs, on behalf of its project California Data Collaborative, through in-kind personnel match and cash.

The CaDC has a five-year operating history as a nonprofit membership organization of local water suppliers with a mission to create tools and applied research supporting planning and analysis in the water industry. Over the last three fiscal years, the CaDC has averaged \$230,000 per year in membership revenue, and this membership revenue is expected to grow in the future with growth in the CaDC member base. Throughout the project, CaDC commits to funding a total of \$200,000 in matching funds for this project. CaDC/SEE proposes to contribute \$60,000 as matching funds during fiscal year (Jul-Jun) 21-22, \$100,000 of matching funds during FY 22-23, and \$40,000 of matching funds during FY 23-24.

8.2 Budget Proposal

Table 1. Total Project Cost

SOURCE	AMOUNT
Costs to be reimbursed with the requested Federal funding	\$199,977.19
Costs to be paid by the applicant	\$200,000.00
Value of third-party contributions	\$0
TOTAL PROJECT COST	\$399,977.19

Table 2. Budget Proposal

BUDGET ITEM DESCRIPTION	\$/UNIT	QUANTITY	QUANTITY TYPE	TOTAL COST
Salaries and Wages				
Christopher Tull, Project Manager / Software Architect	\$6,800	11.34	Months	\$77,112
Operations Associate	\$4,000	5	Months	\$20,000
Fringe Benefits				
Christopher Tull, Project Manager / Software Architect	\$816	11.34	Months	\$9,253.44
Operations Associate	\$480	5	Months	\$2,400
Supplies and Materials				
Servers and Databases on AWS	\$650	22	Months	\$14,300
Contractual/Construction				
Product Webpage Creation				\$5,000
Software Development Contract				
Abe Serrano, Product Manager	\$1,875	24	Months	\$45,000
Data Engineer	\$5,000	6	Months	\$30,000
Backend Developer	\$3,125	24	Months	\$75,000
Frontend Developer	\$3,125	24	Months	\$75,000
UX/UI Designer	\$2,500	9	Months	\$22,500
TOTAL DIRECT COSTS				\$375,565.44
Indirect Costs				
Administrative Fee for Fiscal Sponsor	6.5%	\$375,565.44		\$24,411.75
TOTAL ESTIMATED PROJECT COSTS				\$399,977.19

8.3 Budget Narrative

8.3.1 Salaries and Wages

The CaDC will have one key personnel working on the proposed project, who will lead the following task.

Personnel

The CaDC's lead data scientist, **Christopher Tull**, will serve as the overall **Project Manager** for the proposed project and collaborate with the sub-contractor as a **Systems Architect**.

Christopher led the development of the existing data pipelines, workflows, and models for the CaDC Analytics platform and has extensive knowledge of what is needed to develop a robust data ecosystem for California water data.

An **Operations Associate** will assist with project outreach, which will include setting up meetings with local agency staff to gather user requirements, validate prototypes, and perform user acceptance testing. The Operations Associate will also assist with disseminating project results by organizing webinars, creating case studies and other content, and helping to onboard agencies into using the new platform.

Task 1: Grant Administration

Christopher will work 2.25% of time over 24 months at a rate of \$6,800/month to administer grant funds and generate financial and performance reports.

Salary Sub-Total = \$4,112.64 over 24 months

Task 2: Systems Architecture

Christopher will work 35% of time over 24 months at a rate of \$6,800/month to oversee product development and lead the development of systems architecture, technology infrastructure, and data pipelines.

Salary Sub-Total = \$63,974.4 over 24 months

Task 3: Project Management, Stakeholder Outreach, and User Research

Christopher will work 10% of time over 24 months at a rate of \$6,800/month, facilitating stakeholder outreach, gathering stakeholder feedback, and stewarding project scope and product roadmap. The Operations Associate will work 25% of the time over 20 months at a rate of \$4,000/month, facilitating stakeholder outreach, gathering feedback, organizing webinars, developing educational materials, and onboarding agencies to use the platform.

Salary Sub-Total = \$40,678.4 over 24 months

Total Salaries:

Christopher Tull = \$77,112 over 24 months

Operations Associate = \$20,000 over 20 months

Total Salaries = \$97,112

8.3.2 Fringe Benefits

CaDC/SEE provides benefits to employees at a rate of 12% on listed salaries. This includes payroll taxes as well as workers compensation fees.

Total Salaries for The CaDC = \$97,112

Total Fringe Benefits for CaDC salaries (12%) = \$11,653.44

Total Salaries + Fringe Benefits = \$108,765.44

8.3.3 Materials and Supplies

Based on past experience and estimates, the CaDC estimates the cost of servers and databases on AWS to require a monthly service fee of \$650/month for 22 months.

Total Materials and Supplies = \$14,300

8.3.4 Contractual

Product Webpage. CaDC will create a product webpage about CUWEP on the CaDC website to market the solution and provide technical specifications and instructions to potential users. Quotations will be gathered from web designers to create the product page with a budget of \$5,000 and the most competitive offer will be selected.

Software Design and Development. CaDC/SEE proposes to contract with Water UX, Inc for software design and development. Water UX specializes in human-centered data solutions for water innovation. With a world-class design and development team, Water UX delivers data analysis and visualization solutions that empower water professionals to generate critical data insights and solve large-scale water conservation challenges.

CaDC/SEE's decision to select Water UX to fulfill this role is informed by CaDC/SEE's years of experience building software applications to support decision-making by staff at local water supply agencies. Water UX's knowledge of the CaDC's existing operations and data systems will reduce the project start-up time compared to another firm with similar expertise. Water UX's knowledge of water management needs related to the requirements imposed by SB606/AB1668 is unparalleled thanks to Design Director Abe Serrano's dedication to research and building solutions to address this topic. Water UX's product development methodology, built on approaches to design and software engineering pioneered in the technology sector, reduces the risk and increases the odds of successfully launching new products, which is uncommon among firms providing similar services in the water sector. Lastly, Water UX's proposed labor costs are

reasonable for a product of CUWEP's complexity while still being adequate to bring high-quality technical talent to bear on the project. It is the belief of CaDC/SEE that no other firm could successfully deliver a project of the scope described here for the reasonable price being proposed.

Personnel

The Director of User Experience for Water UX, **Abe Serrano**, will serve as the **Product Manager** for the proposed project and will steward the vision, facilitate the project scope, and manage four key roles listed below to meet milestones and deliverables. Abe's research into SB606/AB1668 during his time as an E2 Fellow has granted him a unique viewpoint into ensuring the success of CUWEP.

Salary Sub-Total = \$45,000

The **Data Engineer** role will work with the Systems Architect and Product Manager in developing ETL and BTL data layers to ingest, process, format, and output data sets necessary for the Backend Developer to query and develop API endpoints. This role will also establish data standards, implement data management best practices, and develop a workflow to aggregate disparate data sources into a standardized data model for long-term implementation and scaling of CUWEP.

Salary Sub-Total = \$30,000

The **Backend Developer** role will work with the Systems Architect and Product Manager in developing database infrastructure and API endpoints to allow for quick and easy access to data for the Frontend Developer to display in the user interface. This role will also establish database infrastructure standards, implement database query best practices, and ensure that database queries are fast and reliable.

Salary Sub-Total = \$75,000

The **Frontend Developer** role will work with the Backend Developer and Product Manager to develop the front-end web application framework and integrate all available API endpoints provided by the Backend Developer. This role will also work closely with the UX/UI designer to develop a design system that utilizes modular user interface components and respond to feedback collected from stakeholder testing sessions.

Salary Sub-Total = \$75,000

The **UX/UI Designer** role will work with the Frontend Developer and Product Manager to design a system of modular user interface components, establish user workflows, and develop prototypes to validate features with stakeholders and increase the overall success of the project by decreasing ambiguity and providing clarity on the specifics of the final web application deliverable.

Salary Sub-Total = \$22,500

Task 1: Data strategy, architecture, and infrastructure planning

The Water UX, Inc. team will develop a data strategy to aggregate disparate data sources and establish a standardized data model for CUWEP. The data strategy will detail systems architecture and technology infrastructure requirements, specifications, and outputs. The CaDC will contract with Water UX, Inc for \$15,000 for Task 1, which includes salaries and wages for Product Manager \$1,875, Data Engineer \$10,000, and Backend Developer \$3,125.

Task 2: UX strategy, data mapping, and user workflows

The Water UX, Inc. team will develop a User Experience (UX) strategy to optimize CUWEP to fulfill the needs and goals of user personas and archetypes. The UX strategy will detail the CUWEP site map, user workflows, and feature requirements and specifications. The CaDC will contract with Water UX, Inc for \$15,625 for Task 2, which includes salaries and wages for Product Manager \$1,875, Data Engineer \$5,000, Backend Developer \$3,125, Frontend Developer \$3,125, and UX/UI Designer \$2,500.

Task 3: Design, test, and iterate low-fidelity prototype

The Water UX, Inc. team will design a preliminary, low-fidelity prototype to test early concepts and validate with stakeholders via user testing sessions. The Water UX, Inc. team will implement the Lean UX methodology of design-test-iterate to incorporate stakeholder feedback and incrementally develop progressive enhancements for CUWEP. The CaDC will contract with Water UX, Inc for \$18,750 for Task 3, which includes salaries and wages for Product Manager \$1,875, Backend Developer \$3,125, Frontend Developer \$6,250, and UX/UI Designer \$7,500.

Task 4: Development (backend/frontend), test, and iterate high-fidelity web application

The Water UX, Inc. team will utilize an Agile web development methodology of develop-test-deploy-review sprint cycles to incrementally develop CUWEP for pilot program implementation. Water UX, Inc will gather stakeholder validation during user testing sessions, and will incorporate feedback into each sprint planning cycle. The CaDC will contract with Water UX, Inc for \$68,750 for Task 4, which includes salaries and wages for Product Manager \$11,250, Data Engineer \$5,000, Backend Developer \$25,000, Frontend Developer \$25,000, and UX/UI Designer \$2,500.

Task 5: Code review, user tasks QA, and system stress-testing

The Water UX, Inc team will conduct a final review of the code base to optimize for performance and scalability in preparation for the launch of pilot programs. A formal QA of user tasks will be conducted, and overall stress-testing of CUWEP will be completed. The CaDC will contract with Water UX, Inc for \$10,000 for Task 4, which includes salaries and wages for Product Manager \$3,750, Backend Developer \$3,125, and Frontend Developer \$3,125.

Task 6: Merge code, go live, and monitor for performance

The Water UX, Inc team will merge code base to parent repository, deploy to a production server and monitor performance. The CaDC will contract with Water UX, Inc for \$8,125 for Task 6, which includes salaries and wages for Product Manager \$1,875, Backend Developer \$3,125, and Frontend Developer \$3,125.

Task 7: Facilitate pilot programs and gather user feedback

The Water UX, Inc team will collaborate with the CaDC and CalWEP to implement a water agency recruitment initiative to establish CUWEP pilot programs at various water agencies across the State of California and gather feedback via structured user testing sessions. The CaDC will contract with Water UX, Inc for \$11,875 for Task 7, which includes salaries and wages for Product Manager \$5,625, Backend Developer \$3,125, and Frontend Developer \$3,125.

Task 8: Prioritize feedback, optimize roadmap, and launch progressive enhancements

The Water UX, Inc team will prioritize user feedback, optimize the product roadmap, and launch progressive enhancements to expand the CUWEP feature set and capabilities. The CaDC will contract with Water UX, Inc for \$75,625 for Task 8, which includes salaries and wages for Product Manager \$5,625, Data Engineer \$10,000, Backend Developer \$25,000, Frontend Developer \$25,000, and UX/UI Designer \$10,000.

Task 9: Deploy code base for public release

The Water UX, Inc team will prepare and deploy the CUWEP code base for public release. The CaDC will contract with Water UX, Inc for \$11,875 for Task 9, which includes salaries and wages for Product Manager \$5,625, Backend Developer \$3,125, and Frontend Developer \$3,125.

Task 10: Implement dissemination campaign and onboard water agencies

The Water UX, Inc team will collaborate with the CaDC to implement a dissemination campaign to promote CUWEP via conferences, webinars, and water professional networks such as the CA Data Summit, WaterSmart Innovations, and ACWA quarterly conference. The Water UX, Inc team will onboard new water agencies and scale customer adoption as CUWEP gains traction. The CaDC will contract with Water UX, Inc for \$11,875 for Task 10, which includes salaries and wages for Product Manager \$5,625, Backend Developer \$3,125, and Frontend Developer \$3,125.

8.3.5 Indirect Costs

SEE requires an administrative fee of 6.5% on all revenue for fiscally sponsored projects. This fee covers HR, invoicing, and other basic administrative duties. Applying this 6.5% fee to the modified total direct costs (MTDC) of \$375,565.44 results in indirect costs of \$24,411.75.

Total Indirect Costs = \$24,411.75

9. Letters of Support and Letters of Participation

Letters of support from nine CaDC member agencies and one nonprofit partner demonstrating their intent to participate in the project are attached as an appendix. These include:

- California Water Efficiency Partnership
- Calleguas Municipal Water District
- Coachella Valley Water District
- Desert Water Agency
- Eastern Municipal Water District
- Inland Empire Utilities Agency
- Moulton Niguel Water District
- Metropolitan Water District of Southern California
- City of Thousand Oaks
- Western Municipal Water District

10. Official Resolution

An official resolution will be adopted by CaDC/SEE's board of directors during a regularly scheduled board meeting on May 11, 2021 and provided within 30 days of the application deadline.

11. Prohibition on Certain Telecommunication and Video Surveillance Services or Equipment

This project will not use any covered telecommunications equipment or services as described in §889 of the 2019 National Defense Authorization Act.

Appendix

A1. Estimating the cost of reporting

Costs for reporting were estimated for three reports required of urban water suppliers: the Urban Water Management Plan, Electronic Annual Report, and the Monthly Monitoring Report (MMR) on water use and conservation. An electronic poll (n=7) was conducted by the California Data Collaborative during Spring 2019 that asked for staff hours and consultant dollars spent submitting each report. For each report, the median number of staff hours and median amount spent on consultants was used to estimate costs for each agency. The median value was chosen over the average to avoid positive skew introduced by one very large agency included in the sample.

Staff hours were priced at \$51.66, the average compensation for state and local government employees in September 2019 according to the U.S. Bureau of Labor Statistics⁹. The number of urban water suppliers is assumed to be 349 based on information contained in a notice of proposed regulatory action dated December 17, 2019 by the State Water Resources Control Board indicating that 349 agencies will be required to submit the MMR.

*MMR: 2 hours * \$51.66 * 349 agencies * 12 months = \$432,704.16 annually*
*UWMP: ((250 hours * \$51.66 + \$30,000) * 349 agencies) / 5 years = \$2,995,467 annually*

*EaR: 40 hours * \$51.66 * 349 agencies = \$721,173.6 annually*

This results in an estimate of \$4,149,344.76 in annual aggregate costs across California's local water agencies to submit these three reports

A2. Documents Demonstrating Expressed Need

Documents demonstrating the expressed need for this project are included:

- CaDC Phase 1A Pilot Scope of Work (January 2016)
- CaDC Phase 1B Pilot Scope of Work (October 2016)
- CaDC Fiscal Year 2017-18 Scope of Work
- CaDC Fiscal Year 2018-19 Scope of Work
- CaDC Fiscal Year 2019-20 Scope of Work
- CaDC Fiscal Year 2020-21 Scope of Work
- Presentation to the CaDC Steering Committee about Streamlining Reporting dated 1/21/20

⁹ <https://www.bls.gov/news.release/ecec.nr0.htm>



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November 20, 2015

Moulton Niguel Water District
27500 La Paz Road
Laguna Niguel, CA 92677

Re: California Data Collaborative Project: Phase One Pilot

To: California Water Agencies:

This Letter of Agreement (“Agreement”) documents the understanding between the California Water Agencies (individually referred to as “Agency” and collectively as “Agencies”) that have executed this Agreement as indicated by the signatures below of their duly authorized representatives.

Project Description

A statewide data collaborative effort is currently underway involving water agencies throughout California, working in partnership with UC Davis, to collect and share data among utilities to improve efficiencies, refine demand management strategies and promote long-term sustainable solutions that build on the water/energy nexus. A cloud-based, secure infrastructure will be built through a non-profit mechanism to house data from agencies and facilitate statewide analysis. The envisioned effort is a three-phase, “bottom-up” approach to providing meaningful input and recommendations that will help shape future water management decisions that have statewide impacts.

- **Phase One Pilot:**

Phase One Pilot will conduct statewide conservation analytics to illustrate the value proposition of this data collaborative approach. A group of retail agencies as identified in this Agreement will work with Patrick Atwater, Project Manager of the Phase One Pilot and a signatory to this Agreement, to share utility and consumption level data. Using various utility and customer level data sets, the pilot group will perform analysis, evaluate data gaps, and determine data needs in an effort to demonstrate the value and effectiveness of demand management programs at the local and statewide level. Participating wholesale agencies may elect to have one retail water utility in their service area provide data and participate in the Pilot Project.

The agencies will participate in monthly meetings, which will be scheduled and facilitated by the Moulton Niguel Water District (MNWD) as part of its In-Kind Contribution as set forth below. It is anticipated that said meetings will commence on or about the January, 2016 and will continue through the

completion of the Phase One Pilot which is estimated to be completed on or about October 2016. The purpose is to better understand the unique characteristics of communities, impact of various demand management strategies, and develop tools to assist agencies collect/analyze data. A report of the pilot and samples of work will be generated during the pilot.

- **Phase Two Pilot:**

Phase Two Pilot will demonstrate a secure, cloud-based platform for sharing water utility data and performing analytics. The cloud-based platform was developed by Professor Frank Loge at UC Davis, who is also a signatory to this Agreement. The Phase Two Pilot will be conducted by CAWaterData.org, a not-for-profit company incorporated with the intent of scaling the platform statewide at the completion of the Phase Two Pilot.

Phase Two will focus on (1) uploading participating agency data into the cloud-based platform; (2) defining agency specific policies for data access, sharing, security, and privacy; (3) customizing the cloud architecture to reflect the specified policies; (4) finalizing a trust framework, a document that describes the laws, regulations, policies, and best practices associated with the cloud-based platform; (5) educating utilities and other stakeholders on the functionality and operation of the platform; and (6) defining the long-term funding model for CAWaterData.org.

The participants for the Phase Two Pilot are expected to include the agencies involved in the Phase One Pilot as well as additional California water agencies that UC Davis has been working with in collecting and analyzing water utility data. Once the value of the data collaborative and the integrity of the platform have been established, the goal is to make the data collaborative available to all water agencies in California in coordination with various State agencies.

- **Phase Three:**

Phase Three is the full implementation of the statewide data collaborative. The terms of participation and the detailed scope of the effort remains to be developed based on the results of Phase One and Two Pilots as well as coordination with water utilities and state agencies.

Scope of the Agreement

This Agreement and the terms contained within as agreed upon by the signatories only pertain to the Phase One Pilot of the overall statewide data collaborative. Signing onto this Agreement does not bind any of the signatories to further pursue Phase Two Pilot or Phase Three. Further participation beyond Phase One Pilot will be established through a separate agreement.

Phase One Pilot Team

The Phase One Pilot team is led by Patrick Atwater, who will serve as the Project Manager. Christopher Tull will serve as the Civic Data Scientist and Eric Schmitt will be the Consulting Statistician, working under Patrick Atwater's direction.

Frank Loge of UC Davis will support the efforts of the Phase One Pilot group to assist in the development of the value proposition.

Participating agencies include East Bay Municipal Utility District, Eastern Municipal Water District, Inland Empire Utilities Agency, Irvine Ranch Water District, Las Virgenes Municipal Water District, Moulton Niguel Water District, and Santa Margarita Water District.

Separate Non-Disclosure Agreement

Participation by each Agency shall be contingent upon a separate non-disclosure agreement or similar arrangement by and between each participating Agency and each Phase One Pilot team member, which provides for the security, privacy, and nondisclosure of the data provided by the Agency. The terms and conditions upon which the data will be provided by each Agency, and the content and extent of such data, shall be determined in the sole discretion of each Agency.

Level of Participation

Financial Contribution - Each Agency that wishes to take part in this Phase One Pilot is required to execute this Agreement and provide financial contributions as set forth below.

Eastern Municipal Water District - \$25,000

Inland Empire Utilities Agency - \$25,000

Irvine Ranch Water District - \$25,000

Las Virgenes Municipal Water District - \$25,000

Moulton Niguel Water District - \$25,000

Santa Margarita Water District - \$25,000

MNWD will be the repository of funds contributed by the Agencies and will then facilitate the applicable payments to the Phase One Pilot team and provide the Agencies with copies of any written receipts or acknowledgements to the Agencies on a timely basis. MNWD will be the general administrative liaison on behalf of the Agencies in regard to funding as well as for communications and other purposes as determined by all the Agencies.

In-Kind Contribution – Each Agency that wishes to participate via in-kind services in the Phase One Pilot is required to execute this Agreement as set forth below:

Frank Loge, UC Davis - will work closely with the Phase One Pilot team and participating agencies to support the development of the value proposition.

East Bay Municipal Utility District (EBMUD) - Richard Harris, Water Conservation Manager will provide project guidance and support. Working with project staff, EBMUD may provide customer-level usage along with other customer characteristic and turf rebate data to facilitate a statewide study of turf market transformation dynamics expanding on the MNWD turf rebate study published by Bloomberg Data for Good in October this year.

Electing To Engage In the Second Phase Pilot and Larger Statewide Project (Phase Two and Phase Three)

The results of the Phase One Pilot will help the Agencies determine the potential benefits of a statewide data collaborative and how best to leverage available data and analyses in future project phases.

Nothing in this Letter shall be deemed to be a binding obligation of any Agency to provide any further financial contribution, in-kind services, data or otherwise take part in any activities beyond this Phase One Pilot. Each Agency may decide whether to participate further, and those Agencies that elect to engage in the next phase will enter into a separate agreement. This document can be signed in counterparts, each of which shall constitute an original. It is anticipated that upon full execution, copies of each signature page will be circulated to all parties.

Eastern Municipal Water District

By: _____

Title: _____

Inland Empire Utilities Agency

By: _____

Title: _____

Las Virgenes Municipal Water District

By: _____

Title: _____

Santa Margarita Water District

By: _____

Title: _____

East Bay Municipal Utility District

By: _____

Title: _____

Irvine Ranch Water District

By: _____

Title: _____

Moulton Niguel Water District

By: _____

Title: _____

University of California, Davis

By: _____

Title: _____

Exhibit “A” – Scope of Work

Title: Measuring the effectiveness of various conservation programs through a new inter-utility, customer-level water usage dataset

Overall Project Objectives

A statewide data collaborative is currently underway involving water agencies throughout California, working in partnership with UC Davis, to collect and share data among utilities to improve efficiencies, refine demand management strategies and promote long-term sustainable solutions that build on the water/energy nexus. A secure, cloud-based platform will be built through a non-profit mechanism (CAWaterData.org) to house water utility data statewide and to facilitate analyses. This effort is a three-phased, “bottom-up” approach to providing meaningful input and recommendations that will help shape future water management decisions that have statewide impact. The goal is to facilitate informed decisions and aid agencies in meeting the State’s goal of demand management through improved understanding of unique characteristics of our communities.

The Phase One Pilot of the project brings together water retailers to consolidate customer level water usage data to proactively share information, ideas, tools, solutions and challenges in an effort to provide a collective input that can showcase how California can achieve water efficiency statewide through smart, bottom up collaborative mechanisms. The purpose is to demonstrate the benefits of a statewide data collaborative in assisting the agencies and decision makers statewide. The Phase Two Pilot of the project will demonstrate a secure, cloud-based platform for sharing water utility data and performing analytics. Upon completion of Phase One and Two Pilot, the Phase Three will be ready for launch, offering a positive, proactive approach to work collaboratively together as a water community across California to achieve water efficiency smartly statewide.

California’s worst drought in recorded history demands visionary leadership. Throughout our state’s history, water utilities have come together to pioneer new physical infrastructure to ensure a safe and reliable supply for the people of California. This project will honor that tradition and California’s world renowned “pioneering spirit” by boldly building the world’s first data utility to manage cutting edge data infrastructure. Climate change, demographics, and thousand year hydrological records suggest water scarcity will be the new normal in twenty first century. Yet while the future is ultimately uncertain, by working smartly and collaboratively, we can prepare to adapt to whatever the future holds.

Project Task 1: Statewide analysis of conservation program effectiveness

The goals of this component of the project include:

1.1 Analyze unique characteristics of different parts of California and its diverse communities

1.1.1 Collect, organize, clean, and generate a statistical dataset from the sources listed below this task specification.

- 1.1.2 Develop analyses of various conservation programs effectiveness on reducing water usage. Aggregate impact of individual water conservation programs on agency water demand and revenues
- 1.1.3 District-level averages as well as results for various socio-economic and demographic groupings, environmental characteristics, and neighborhood characteristics.

1.2 Learn from successes and challenges of different demand management programs

- 1.2.1 Write a summary report and present results to agency personnel and board members. Report articulating statewide water efficiency benefits and succinct value proposition of robust granular water data. This report is anticipated to include the following key sections incorporating analyses developed in project task one:
 - Baseline water usage trends and patterns:
 - Water usage trajectory quantiles by customer segment for each participating utility from as long as is feasibly available and including at least 2013 – 2015.
 - Those trajectories will be overlaid with conservation actions taken by utilities (dates of public education campaigns, rate shifts, etc.) to better understand “what works” to achieve water efficiency.
 - Those trajectories will be compared that with what the state “sees” in residential gallons per capita per day and other statewide metrics.
 - Scope how smart “bottom up” water efficiency projects enabled by this data infrastructure can scale statewide.
 - Discuss lessons learned for future demand management and potential statewide water efficiency targets.

1.3 Conducting preliminary statistical analysis into the effectiveness of turf rebates by expanding the MNWD Turf Rebate Study published by Bloomberg Data for Good.

Each financially contributing retail water agency will be responsible for providing customer-level water usage data. Participating wholesale water agencies may provide this conservation analytics service at no charge to up to one retail agencies in their service area. Further wholesale agencies with parcel-level irrigable area will provide said data along with as granular water usage data as is available.

Contingency: In the event that the State Water Resources Control Board elects to provide statewide Clean Drinking Water metered usage data at the customer class level, the Phase One Pilot team will include said data in their analysis of statewide conservation programs.

In addition, Phase One Pilot staff will work with the analytical point persons on the technical working group to provide contextual data sources with clear spatial, temporal and quantitative characteristics to inform inter-utility, customer-level water usage data when available:

- Agency-level factors (Data Sources: participating water agencies)
 - Water pricing policy (i.e., structure and level)
 - Rebate levels
 - Conservation program participation
 - Outreach / media efforts
 - Conservation BMP Reporting (Data Sources:
- Household-level factors (Data Sources: Participating utilities and US Census)
 - Socio-economic factors (e.g., income, education)
 - Demographic factors (e.g., ethnicity, household size)
 - Property characteristics (e.g., lot size, age of house, irrigated area)
 - Customer awareness (through identifying district-level awareness campaigns)
- Community / Environmental Factors (Data Sources: Participating utilities, CIMIS)
 - Neighborhood program participation levels, if available
 - Outreach efforts from other agencies (wholesale and neighboring), if available
 - Methods of community outreach and engagement (e.g., newspapers, agency website, social media, community newsletters, HOA meetings, Chamber of Commerce events, etc.)
 - Biophysical factors (e.g., precipitation, temperature, evapotranspiration)

Exhibit B – Project Schedule

It is anticipated the proposed project will require nine months to complete. The Gantt chart below is intended to be illustrative of the timing of deliverables and events.



Exhibit C – Phase One Pilot: 9-Month Budget

The total estimated budget for the nine month project is \$125,000. In the event that more than five agencies participate, the additional resources will be used to conduct additional turf rebate impact evaluation research (Task 1.3).

Title	Name	Hourly Rate
Project Manager	Patrick Atwater	\$80
Civic Data Scientist	Christopher Tull	\$60
Consulting Statistician	Eric Schmitt	\$150

The project team will conduct work at the above rates. Phase One Pilot team work hours will be conducted on project tasks at the below not to exceed hours.

Title	Task	Hourly Rate	Estimated Budget
Project Manager	1.1 Data collection and organization	\$80	\$10,000
	1.2 Report on achieving water efficiency smartly statewide		\$40,000
	1.3 Statistical Analysis of turf rebate effectiveness exploiting natural experiments		\$12,000
Civic Data Scientist	1.1 Data collection and organization	\$60	\$15,000
	1.2 Report on achieving water efficiency smartly statewide		\$25,000
	1.3 Statistical Analysis of turf rebate effectiveness exploiting natural experiments		\$14,000
Consulting Statistician	1.3 Statistical Analysis of turf rebate effectiveness exploiting natural experiments	\$150	\$4,500

The Phase One budget also includes travel (auto mileage and six flights to Sacramento) and office expenses (including for example printing, draft memos, reports, other presentation materials, and co-working space) estimated at approximately \$4,500.

Exhibit D – Data Collaborative Phase One Pilot Team Bios and Qualifications

Project Manager

Patrick Atwater has over five years of experience in data intensive roles in the water and information technology industries. He ran the numbers for the State Water Contractors on Governor Brown's \$13 billion Bay Delta fix and co-authored the feature June 2015 American Water Works Association article on how data science can help water utilities adapt to climate change. Projects include: developing the financial model for the proposed Claremont Colleges 300,000 gallons per day MBR recycled water plant; generating financial analysis at 14 local government agencies with combined budget of over \$5 billion; CFO level analysis for a first-of-its-kind securitization structure for a \$700 million groundwater treatment facility; and presenting California's first 2010 redistricting GIS analysis to an audience of over 100 municipal managers.

Civic Data Scientist

Christopher Tull recently graduated with a Masters from the Center for Urban Science and Progress, the nation's leading civic data science program founded by ex-Cal Tech provost Steven Koonin and launched as part of the Bloomberg applied sciences initiative. He has worked as a research assistant at the Max Planck Institute for Biological Cybernetics as well as NYU CUSP, where his work on energy-water usage intensity in NY won best paper at the Bloomberg Data for Good Exchange. He is highly proficient in the following programming languages: Python, R, Java, Javascript, C++, C, SQL. In addition, Chris has experience working with the following technologies: ArcGIS, CartoDB, Git, Eclipse, RStudio, IPython Notebook, Excel, Mysql, Postgresql/PostGIS.

Consulting Statistician

Eric Schmitt co-authored the MNWD turf rebate study published by Bloomberg Data for Good in September 2015. Previously, Eric has worked as an economic consultant at NERA Economic Consulting for two years performing econometric analyses on topics ranging from anti-trust to consumer behavior in the tobacco industry. He is completing a PhD in statistics from KU Leuven University and currently works as a statistician at Protix Biosystems, a pioneering technology company creating efficiencies in the water-food nexus through high volume insect products. He has provided statistical consulting services for and spoken before leading companies, such as Mars, Inc. and Tableau Technologies, and is the author of peer-reviewed articles in theoretical and industrial statistics, education, and medicine.

Exhibit E – Phase One Pilot Team Roles and Responsibilities

Phase One Project Team		
Name	Title	Role
Patrick Atwater	Project Manager	Management / Analysis
Christopher Tull	Civic Data Scientist	Analysis / IT
Eric Schmitt	Consulting Statistician	Research / Analysis

In addition, to the extent available, each participating California water agency will be responsible for providing the following staff to participate in the Technical Working Group (Note, agency staff may fill more than one role):

- Senior Management: attend technical working group meetings and provide feedback on analytical work products.
- Analytical Point Person: respond to questions about water usage data provided and conservation program context (programs implemented, timing, levels, neighboring district programs, etc.).
- IT Staff: ensure timely transfer of data required by the project.



Phase 1B Common Project Tasks

The phase 1B scope of work deepens and builds on the three initial project tasks from the Data Collaborative phase one MOU executed January 21, 2016 to integrate water use data, surface insights on statewide water efficiency and statistically evaluate the effectiveness of water efficiency actions like the turf rebate program.

The Phase 1B scope of work common across all participating agencies focuses on supporting water managers in navigating the rapidly evolving statewide water efficiency landscape by analyzing the implications of the Governor's long term framework, measuring the impact of water efficiency actions, and improving how water data is managed to power that work into the future.

In order to help clearly, accurately, and concisely convey these insights to water managers, this work will develop several [visualizations](#) to benchmark water efficiency, measure conservation impact and model rate shifts.

1. **Data Management:** Onboarding new utilities and integrating additional customer use data
 - a. Automating water use data ingestion
 - b. Develop a legal framework for resharing data that protects customer privacy to operationalize the Trust Framework developed by UC Davis. The goal is to streamline data sharing both technically and legally, but ultimately the decision on how the raw data is shared is up to the discretion of each individual utility providing that data.
 - c. Surfacing water data management best practices and feasibility of data integration proposed in the Dodd bill through a UCLA system architecture research fellow.
2. **Statewide Efficiency:** Report on lessons learned for statewide efficiency and understanding the implications of the long term framework
 - a. Water data summit at Stanford to showcase results for a statewide audience
 - b. Interactive web [visualization](#) of statewide efficiency using MWELo framework
 - c. Improving land cover assessments to estimate the impact of various long term framework scenarios
 - i. Open landscape area classification assessment
 - ii. Andrew Marx CGU Work to measure landscape area across MWD
 - iii. Using Google Earth Engine and NAIP to measure landscape area statewide
3. **Data-driven demand management:** develop and deploy dashboards visualizing future water demand and measuring the effectiveness of conservation actions including rebates, rates and messaging.
 - a. Develop a generalizable [visualization](#) tool to measure the water savings of any conservation rebate
 - b. Deploy prototype interactive 1-4 week ahead demand forecasting [visualization](#) developed in partnership with MNWD and DataKind: CaliforniaDataCollaborative.com/future (requires recycled water system data)
 - i. See CaliforniaDataCollaborative.com/future for an example
 - c. Coordinate with participating agencies to implement surveys of customer conservation motivations and standardize conservation outreach data collection. Collaborate with the water efficiency industry to acquire additional market transformation data.
 - d. Develop a rate tool to support agencies in achieving revenue reliability with increased



focus on efficiency

- i. Collaboration with MNWD in developing a flexible rate modeling [visualization](#) using R Shiny and implement with participating CaDC agencies.
- ii. Implementation of rate research agenda developed as part of the June 8 technical working group meeting to improve how water sales are forecasted under alternative pricing scenarios in the tool outlined in 3c(i). This ties into our collaboration with our academic partners and ongoing work to improve how data is shared. We are having monthly meetings as part of the follow up with UC Davis CWEE's "Trust Framework" development in-kind contribution.

This updated scope of work common across participating agencies can be supplemented with specific needs from participating agencies. Part of the value of this investment in the underlying data infrastructure is that any tools developed can be repurposed for any agency that participates in the California Data Collaborative.

CaDC Fiscal Year 2017 - 2018 Scope of Work

July 1, 2017 through June 30, 2018

Summary of successes to date

Since launching in January of 2016, the California Data Collaborative partnership has grown from seven to fourteen water agencies and developed a broad network of academic, technology and industry collaborations. This visionary investment from leading water utilities has already shown results. Key successes are summarized below.

1. CaDC staff has completed a rapid assessment of Governor Brown's statewide water use efficiency targets in partnership with Claremont Graduate University.
2. Working in deep collaboration with members of the technical working group, CaDC staff has implemented the requested feature improvements to the rate comparison tool.
 - a. In addition, CaDC staff has developed a new open water rate specification to deploy tool more efficiently.
3. CaDC staff has also ongoing evaluation of outdoor water use efficiency programs.
 - a. Statistical analysis of water savings
 - b. CGU collaboration on remote sensing to measure changes in photosynthetically active turf to estimate the peer effect associated with turf rebate programs.
 - c. Civic Spark Survey of Outdoor water use attitudes

Perhaps of most long term value is the underlying investment in new 501(c)3 nonprofit data infrastructure and the ability to leverage that data to support water managers in ensuring water reliability for years to come.

CaDC Staffing

The CaDC project has been staffed cost effectively through ARGO Labs, a 501(c)3 civic data science nonprofit. This data team will work closely with the new data action teams in the coming fiscal year to improve how CaDC analytics are operationalized to support participating water utilities.

Position	Description	Current	Proposed FY 17-18
CaDC Project Manager	Ensure analytics support water managers	Full Time	Full Time
CaDC Data Scientist x2	Integrate data and develop analytics	Full Time x 2	Full Time x 2
Program Coordinator (Part time contractual)	Streamline integrating data, managing CaDC events, supporting deployment of tools	60 estimated hours a month	Full Time
Backend Engineering (Part time contractual)	Build underlying data infrastructure	100 estimated hours a month	Utility growth or expansion projects
Administrative Assistant (Part time)	Scheduling, invoicing, and other administrative tasks as necessary	N/A	40
TOTAL		3.5 FTE	4.5 FTE

The CaDC partnership has also benefited from its diverse network of academic and technological talent, enjoying low cost and pro bono internship and volunteer projects as detailed below.

Position	Description	Estimated Total Hours for Phase 1B
Research Fellows x3	<ul style="list-style-type: none"> Redeploying demand forecasting tool for EMWD Developed AB 1755 feasibility study Conduct open accuracy assessment with remote sensing vendors 	400 total or 40 hours a month
Analytics Interns x2 (In California)	Support core CaDC analytics development	400
CUSP Winter Internship (6x in NYC)	<ul style="list-style-type: none"> Inventory and develop metadata for every dataset in AB 1755 Supplement CIMIS evapotranspiration data with additional sources Standardize utility water rates across California 	240

The core CaDC budget for the next fiscal year focuses on funding staffing to support utilities in operationalizing CaDC analytics deployed for participating retailers including the CaDC efficiency explorer tool, rate comparison tool and demand forecasting tool.¹

FY 2017 - 2018 Core Dues Structure

¹ Note the demand forecasting tool is a tailored collaboration working to pilot the approach with specific agencies. This pilot is staffed primarily through a CaDC research fellow and the tool was initially developed by a DataKind volunteer team.

The following diagram details core CaDC revenue for the scope of work common across agencies.

Jan 2016	Sep 2016	July 2017	June 2018
Phase 1A		Phase 1B	FY 2017-18
Budget: \$150k		Revenue to date: \$284.8k	Proposed core budget: \$402k

At the March 10, 2017 CaDC Administrative meeting, staff across participating utilities discussed annualizing and expanding membership to fund additional staffing. The resulting fee structure is broken down by the number of retail metered connections that a utility serves:

1. Utility cost for full metered use data integration
 - a. Less than 15,000 meters = \$17,500
 - b. Between 15,000 – 150,000 meters = \$35,000
 - c. More than 150k = \$70,000

These resources will empower increased staffing to support CaDC utilities in operationalizing CaDC analytics. This plan is being implemented in collaboration with the technical working group through the targeted CaDC data action teams.

Participating wholesalers can sponsor retailers in their service with full metered use data integration fees determined as above. In addition, CaDC staff can develop customized open source analytics solutions for participating wholesalers using system operations data as detailed in the “potential additional work with system operations data” section.

In addition, utilities may elect to participate as a CaDC knowledge sharing member in order to participate in technical working group workshops, collaborate with other CaDC data action team members in monthly webinars, two tickets to the annual CaDC water data summit and have input into CaDC initiatives to set new data standards. That fee is a flat \$5,000 for member participation.

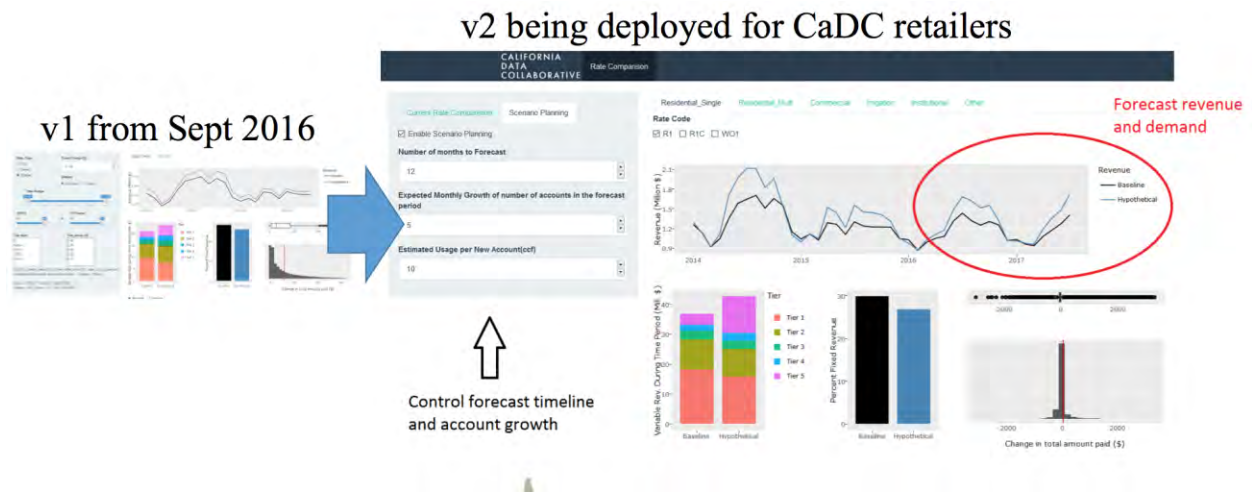
FY 2017-18 Focus: Operationalizing CaDC Analytics

CaDC staff has developed new cutting edge open source analytics to benefit participating utilities. These tools are described briefly below and the focus of the 2017-18 fiscal year is

expanding the impact and usefulness of these tools through targeted CaDC data action teams. These five teams coordinate CaDC work in 1) statewide efficiency targets 2) water use efficiency evaluation 3) rate modeling 4) demand forecasting and 5) events and communications.

Rate Comparison

The CaDC Rate Comparison tool is an open source software tool developed by the California Data Collaborative (CaDC) designed to estimate the impact of a water rate shift. Open source means the tool benefits from in-kind academic and other technology collaborations, as well as review and comments from other individuals and organizations. This tool has matured greatly in the past six months and has expanded to incorporate all customer classes and enhanced scenario planning functionality to project growth in accounts broken out by each customer class.



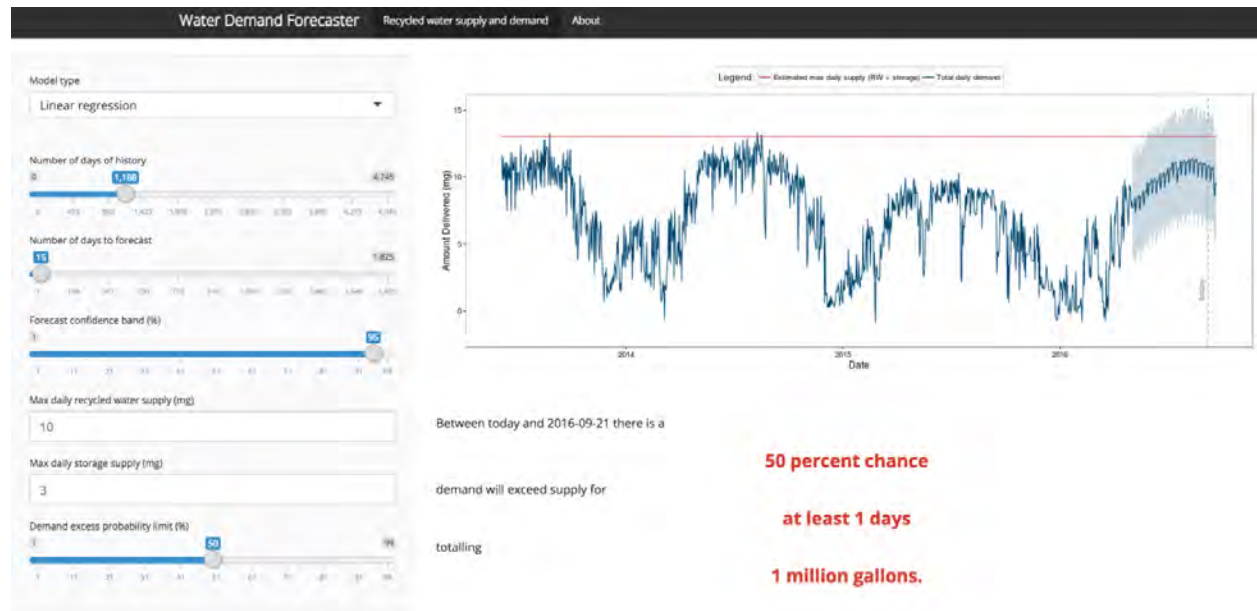
Efficiency Explorer

The efficiency explorer tool has a statewide and neighborhood level component. These interactive dashboards are supplemented by deeper analyses by CaDC staff responding to participating agency data action team member requests.

- *Statewide efficiency explorer*
- *Neighborhood level efficiency explorer*
- *CaDC staff analyses responding to agencies' requests*
 - These efficiency explorer tools are aimed to provide a simple, easy to navigate picture of water efficiency across a utility's service area. That simple water efficiency benchmarking exercise will be supplemented by CaDC staff responding to water use efficiency evaluation data action team member requests. Common requests across utilities will be formalized into a reusable report generated by a CaDC programming tool.

Demand forecaster

Faced with a historic drought and future uncertainty, California water managers need all the tools they can get to ensure water reliability. Short term demand forecasting has a long track record of helping manage peak loads in energy, and this new tool created by DataKind brings that approach to help manage recycled water demand peak loads and reduce the need for potable makeup water for irrigation watering. The CaDC water demand forecasting tool allows users to select the number of days of history to use for the forecast and how long into the future to forecast. In addition, it shows the uncertainty with the forecast and calculates the probability that outdoor irrigation demand will exceed recycled water supply. This tool will be deployed for agencies with recycled water and outdoor irrigation demand optimization needs. The results of the pilot will be shared with CaDC members and the underlying demand forecasting technology improvements will be recorded so that they can be deployed for other agencies.



The foundation of the core CaDC project deliverables for FY 17-18 involves improving these CaDC analytics and operationalizing them with partner CaDC utilities via data action teams.

FY 2017-18 Core CaDC Project Deliverables

Over FY 2017-18 the CaDC will work with the CaDC data action teams to operationalize CaDC analytics. These data action teams will meet monthly and will work collaboratively to integrate these tools into ongoing CaDC utility workflows to benefit their utilities. In addition, the full technical working group will continue to meet quarterly to find common points of collaboration. Lastly CaDC staff will work with the Outreach / Events Data Action Team to put on the 2017 CaDC water data summit in September. Furthermore, CaDC staff will develop feature

improvements to CaDC analytics as described below to expand the value of the project for participating utilities.

There has been discussion of piloting a new system operations data integration project to explore in particular the nexus between indoor water use and recycled water flows. That work is currently being planned and would be covered by a separate scope of work.

Rate Comparison Feature Upgrades: Estimate the demand effects of price changes
(Rate Comparison Data Action Team)

Currently, Rate Comparison assumes constant demand based on historical water use. After this work, the tool will update demand estimates based on change in price from a historical baseline and a user-provided price elasticity.

This involves the following functionality:

1. Allow users to specify a price elasticity, but provide a default from the literature.
 - a. The initial default for utilities can be the price elasticity developed² by USBR Economist Steven Piper in the 2014 study “The Influence of Conservation Pricing and Other Non-Price Factors on Residential Water Demand”, or another requested study.
2. Estimate hypothetical water demand given change in price and user-provided elasticity.
 - a. This will be implemented as the impact of a change in nominal average price on average demand in line with the methodology and data aggregation used in Steven Piper’s study. Potential methodological improvements will be discussed by the CaDC research committee and upon recommendation by said Committee, incorporated into the CaDC rate comparison tool.

This functionality will improve the CaDC rate comparison tool to support water managers in dynamic and industry leading “what if” analysis to understand and plan for the impact of prospective rate changes.

Statewide Efficiency Targets: Supporting Water Utilities in Planning for the Future
(Statewide efficiency target data action team)

The CaDC powered by ARGO Labs has conducted a first assessment of statewide efficiency targets described in Governor Brown’s May 2016 Executive Order on “Making Conservation a California Way of Life” (EO).³

The CaDC statewide efficiency explorer tool allows users to navigate statewide residential water efficiency targets. The key excerpt from the EO is copied below:

² <http://www.usbr.gov/research/projects/detail.cfm?id=414>

³ https://www.gov.ca.gov/docs/5.9.16_Attested_Drought_Order.pdf

“These water use targets shall be customized to the unique conditions of each water agency, shall generate more statewide water conservation than existing requirements, and shall be based on strengthened standards for:

- A. Indoor residential per capita water use;*
- B. Outdoor irrigation, in a manner that incorporates landscape area, local climate, and new satellite imagery data;*
- C. Commercial, industrial, and institutional water use; and*
- D. Water lost through leaks.”*

This high level executive order is further specified in the draft report from the Department of Water Resources (DWR) and State Water Resources Control Board (SWRCB).⁴ This initial iteration funded by the Water Foundation focuses on residential water efficiency.

In particular, the CaDC Efficiency Explorer focuses on residential indoor and residential outdoor water use to set an initial target. The CaDC Efficiency Explorer tool incorporates this target calculation for any user-selected time period.

In addition, the CaDC Efficiency Explorer tool is policy-neutral and enables users to input an indoor GPCD and/or outdoor ET adjustment factor of their choosing. In each user-defined scenario, the aggregate statewide residential target for the previous twelve months is shown against the existing SBx7-7 target and the total residential usage for that same period.⁵

In FY 17-18, CaDC staff will maintain this tool for the benefit of CaDC member utilities to plan for future potential policy changes. In addition, staff will work collaboratively with other participating utilities to scope the data requirements to expand outdoor irrigation from residential to all customer types.

CaDC staff has also developed an applied research and development partnership with NYU CUSP to benchmark CII water use as called for by section 2C of the executive order. Working with Professor Constantine Kontokosta of NYU's Center for Urban Science and Progress, the CaDC is benchmarking efficient water use across Commercial, Industrial, Institutional and Multifamily Residential customer classes using our standardized data. This approach has been pioneered by CaDC staff for NYC, resulting in an award-winning Energy & Water Performance Map and associated journal paper. Lastly, CaDC staff looks forward to working with partner utility staff to scope the data requirements to improve leak loss detection.

Water Use Efficiency Report: Supplementing the Interactive Efficiency Explorer Dashboard

(Water Use Efficiency Evaluation Data Action Team)

⁴ http://www.water.ca.gov/wateruseefficiency/conservation/docs/EO_B-37-16_Report.pdf

⁵ Note the SBx7-7 target is an aggregate utility wide number that is adjusted by the percent of residential usage for the utility service area obtained from the monthly supplier report.

The Phase 1A Scope of Work involves integrating metered customer use data from participating agencies into the standardized “Strategic California Urban Water Use Data Waterhouse” (“SCUBA”) schema. In addition the Phase 1A Scope involves analyzing water use patterns by customer demographics, geographic, temporal and hydrologic factors.

Based on a request from WMWD for a Water Use Efficiency Master Planning Report, CaDC staff will stratify participating retailer customers by:

- Customer class
- Customer factors (household size and landscape area)
- Seasonal consumption trends
- Observed changes in water use due to policy factors (drought, rates, programs)
- Ranking of customers from least efficient to most efficient
- Water savings potential

This work will be developed through automated reporting code so that it benefits all CaDC participating agencies.

Streamlining participation in research projects and setting a new standard for statistical excellence in the water industry

(Research Committee and Water Use Efficiency Evaluation Data Action Team)

As part of the Phase 1B NDA, CaDC utilities can share data subject to written permission from the requisite utility management. Core metered use data can be leveraged for additional projects. One of these is the aforementioned applied research project in partnership with NYU CUSP on CII water use. In addition, CaDC staff can share this data with other academic research projects subject to written permission from the respective utility management. That process has been legally incorporated into the CaDC non-disclosure agreement and CaDC staff has been collaborating with UC Davis on their trust framework, NYU CUSP on its data facility “safe data” protocols, and researching global best practices. Those will be operationalized with the CaDC Research Committee composed of technical working group staff and academic collaborators.

In addition, CaDC staff has developed open source statistical packages as part of its work measuring the water savings of turf removal. CaDC staff will work with researchers to publish the statistical analysis as part of their research as part of the “open science” trend in academia to make research replicable and reproducible.

Pilot demand forecasting tool and share results with other CaDC members

(Demand Forecasting Data Action Team)

CaDC staff has developed prototype demand forecasting tools for several CaDC agencies. These tools will be integrated into those CaDC partner utility operations in FY 17-18 and

iteratively improved. Lessons learned from this pilot will be disseminated and discussed with the larger group of CaDC members.

Potential additional work

(Would involve integrating additional data)

The CaDC project to date has focused on integrated metered water use data to support water managers in achieving water reliability. That data has been invaluable in highlighting the unique local circumstances of California's water utilities and supporting agencies in navigating the rapidly evolving statewide landscape through new open source analytics.

Additionally, there has been some interested for the CaDC project to broaden to supplemental data streams. Those are listed below and would require a specific work plan and budget to adequately resource that new work.

1. Storm water data collaboration (pilot with OC Public Works and MWND)
2. SCADA Flow Data
 - a. Analyzing indoor water use, sewer flows, and recycled water capacity
 - b. Energy water nexus optimization
3. Collaborating with the state on AB 1755 implementation

Appendix 1 -- CaDC Data Action Teams and Committee Structure

CaDC Data Action Teams

The big bullets list the CaDC data action teams with participating agency staff. The sub-bullets list the items the data action team will address. Links provide context on the team projects.

1. [Statewide Efficiency Targets team](#)
 - o Statewide Efficiency Explorer
 - o Landscape area
 - o CII
 - o Leak loss
2. [Water Efficiency Evaluation team](#) (Water Resources)
 - o Statistical Methods
 - o WUE Summary Report
 - o Civic Spark Survey
 - o Neighborhood-level Efficiency Explorer
3. [Rate Comparison team](#) (Finance)
 - o Statistical Methods

- [OWRS](#)
- Rate comparison tool
- User guide development
- 4. [Demand Forecasting team](#) (Planning / Operations)
 - Statistical methods
 - Tool deployment
- 5. Outreach / Event team (Public Relations)
 - Data Summit Planning
 - Workshop Planning
 - Marketing / Case Studies/ Press Releases

Other CaDC Committees

1. Research Committee
 - Topics
 - i. Statistical methods
 - ii. QA / QC data sharing procedures
 - iii. Discuss potential new research projects
 1. Rotating academic presentations / webinars
2. Administrative Committee
 - Responsibilities
 - i. Approve membership fees
 - ii. Ensure quality and timely completion of work
 - iii. Approve new data action teams
 - iv. Review project budget

Appendix 2 -- Phase 1B Progress Report

(March 2017)

Data-driven demand management

Phase 1B Task 2.0	Status	Staffing
Develop rate modeling tool	Deployed as part of MNWD 2017 budget	CaDC core data team and MNWD collaboration
Second iteration of water savings statistics (including additional rebates)	In progress – ETA Summer 2017	CaDC core data team and part-time project statistician
Demand forecasting	In progress	UCLA Research Fellow and EMWD collaboration
Survey outdoor water use attitudes	Survey begins 4/1	Civic Spark Fellows

Statewide efficiency targets (top priority in June 2016 meeting)

Phase 1B Task 1.0	Status	Staffing
Develop interactive web visualization of efficiency targets	Substantial back end improvements from prototype shown at Stanford	CaDC core data team
Improve landscape area measurements	First iteration complete with Andrew Marx	CGU Collaboration and engagement with TWG
(Supplemental) Land use data development to integrate landscape area into efficiency explorer tool	Complete	CaDC core data team

Building water data infrastructure

Phase 1B Task 3.0	Status	Staffing
Internal automation of data ingestion	Completed internal infrastructure upgrade	CaDC core data team
Enable data sharing with utility permission -- Part of Phase 1B NDA	Complete	MNWD In-Kind Legal Support
Support effective implementation of the Open and Transparent Water Data Act	Completed feasibility study Completed inventory Developing draft protocols	Interns and UCLA research fellow

Appendix 3 -- Phase 1A Original Scope of Work

Title: Measuring the effectiveness of various conservation programs through a new inter-utility, customer-level water usage dataset

Overall Project Objectives

A statewide data collaborative is currently underway involving water agencies throughout California, working in partnership with UC Davis, to collect and share data among utilities to improve efficiencies, refine demand management strategies and promote long-term sustainable solutions that build on the water/energy nexus. A secure, cloud-based platform will be built through a non-profit mechanism (CAWaterData.org) to house water utility data statewide and to facilitate analyses. This effort is a three-phased, “bottom-up” approach to providing meaningful input and recommendations that will help shape future water management decisions that have statewide impact. The goal is to facilitate informed decisions and aid agencies in meeting the State’s goal of demand management through improved understanding of unique characteristics of our communities.

The Phase One Pilot of the project brings together water retailers to consolidate customer level water usage data to proactively share information, ideas, tools, solutions and challenges in an effort to provide a collective input that can showcase how California can achieve water efficiency statewide through smart, bottom up collaborative mechanisms. The purpose is to demonstrate the benefits of a statewide data collaborative in assisting the agencies and decision makers statewide. The Phase Two Pilot of the

project will demonstrate a secure, cloud-based platform for sharing water utility data and performing analytics. Upon completion of Phase One and Two Pilot, the Phase Three will be ready for launch, offering a positive, proactive approach to work collaboratively together as a water community across California to achieve water efficiency smartly statewide.

California's worst drought in recorded history demands visionary leadership. Throughout our state's history, water utilities have come together to pioneer new physical infrastructure to ensure a safe and reliable supply for the people of California. This project will honor that tradition and California's world renowned "pioneering spirit" by boldly building the world's first data utility to manage cutting edge data infrastructure. Climate change, demographics, and thousand year hydrological records suggest water scarcity will be the new normal in twenty first century. Yet while the future is ultimately uncertain, by working smartly and collaboratively, we can prepare to adapt to whatever the future holds.

Project Task 1: Statewide analysis of conservation program effectiveness

The goals of this component of the project include:

1.1 Analyze unique characteristics of different parts of California and its diverse communities

1.1.1 Collect, organize, clean, and generate a statistical dataset from the sources listed below this task specification.

1.1.2 Develop analyses of various conservation programs effectiveness on reducing water usage.

Aggregate impact of individual water conservation programs on agency water demand and revenues

1.1.3 District-level averages as well as results for various socio-economic and demographic groupings, environmental characteristics, and neighborhood characteristics.

1.2 Learn from successes and challenges of different demand management programs

1.2.1 Write a summary report and present results to agency personnel and board members. Report articulating statewide water efficiency benefits and succinct value proposition of robust granular water data. This report is anticipated to include the following key sections incorporating analyses developed in project task one:

- Baseline water usage trends and patterns:
- Water usage trajectory quantiles by customer segment for each participating utility from as long as is feasibly available and including at least 2013 – 2015.
- Those trajectories will be overlaid with conservation actions taken by utilities (dates of public education campaigns, rate shifts, etc.) to better understand "what works" to achieve water efficiency.
- Those trajectories will be compared that with what the state "sees" in residential gallons per capita per day and other statewide metrics.
- Scope how smart "bottom up" water efficiency projects enabled by this data infrastructure can scale statewide.

- Discuss lessons learned for future demand management and potential statewide water efficiency targets.

1.3 Conducting preliminary statistical analysis into the effectiveness of turf rebates by expanding the MNWD Turf Rebate Study published by Bloomberg Data for Good.

Each financially contributing retail water agency will be responsible for providing customer-level water usage data. Participating wholesale water agencies may provide this conservation analytics service at no charge to up to one retail agencies in their service area. Further wholesale agencies with parcel-level irrigable area will provide said data along with as granular water usage data as is available.

Contingency: In the event that the State Water Resources Control Board elects to provide statewide Clean Drinking Water metered usage data at the customer class level, the Phase One Pilot team will include said data in their analysis of statewide conservation programs.

In addition, Phase One Pilot staff will work with the analytical point persons on the technical working group to provide contextual data sources with clear spatial, temporal and quantitative characteristics to inform inter-utility, customer-level water usage data when available:

- Agency-level factors (Data Sources: participating water agencies)
 - Water pricing policy (i.e., structure and level)
 - Rebate levels
 - Conservation program participation
 - Outreach / media efforts
 - Conservation BMP Reporting (Data Sources:
- Household-level factors (Data Sources: Participating utilities and US Census)
 - Socio-economic factors (e.g., income, education)
 - Demographic factors (e.g., ethnicity, household size)
 - Property characteristics (e.g., lot size, age of house, irrigated area)
 - Customer awareness (through identifying district-level awareness campaigns)
- Community / Environmental Factors (Data Sources: Participating utilities, CIMIS)
 - Neighborhood program participation levels, if available
 - Outreach efforts from other agencies (wholesale and neighboring), if available
 - Methods of community outreach and engagement (e.g., newspapers, agency website, social media, community newsletters, HOA meetings, Chamber of Commerce events, etc.)
 - Biophysical factors (e.g., precipitation, temperature, evapotranspiration)

California Data Collaborative (“CaDC”) FY 2018-19 Scope of Work

This document summarizes the CaDC scope of work for the coming fiscal year. The work is focused on 1) automating water savings performance metrics 2) deploying data visualization tools 3) categorizing CII water use for benchmarking analysis 4) streamlining state reporting and 5) analyzing statewide outdoor water use.

Automated Water Savings Analysis

1. Working with the Water Efficiency Data Action Team (“DAT”) to develop an analytical pipeline that will track actual water savings for a goal of 5 conservation measures.
2. Integrate water savings tool into current visualization tools.
3. Work with Water Efficiency DAT to develop a standard format for collecting information about conservation programs. Reach out through CalWEP, MWD’s water use efficiency group and other conservation organizations to promote standardization.

Estimated CaDC staff time involved:

- Project Manager: this project has already been well scoped technically so minimum time to coordinate DAT activities (unless there are unforeseen challenges)
- Data Scientist: approximately 300 hours of dedicated data engineering work to implement and integrate into all the data visualization tools.
- Intern / Research Fellow: currently developing a prototype version of this tool as a final project.

Local Utility Data Visualization Tools

1. Data visualization tool will be made available for each retail member agency. The tool will include:
 - Cleaned up agency metered water use data integrated with;
 - Photosynthetically active turf, trees and shrubs at a parcel level from NAIP;
 - Geospatially linked evapotranspiration data from CIMIS;
 - Census information including neighborhood income, education and demographics.
2. Working with the Statewide DAT, develop a set of queries and reports that compares agency results and information.
3. Working with technical agency staff, deploy the visualization tool for individual agencies. Include training for agency staff.

Estimated CaDC staff time involved:

- Project Manager: 10 hours a month (120 total) to coordinate user interviews with staff at participating CaDC agencies every 1-2 months.
- Data Scientist: 10-40 hours a month depending on utility staff needs.
- Interns / Research Fellow: opportunity to develop prototypes of experimental ideas.



Additional Opportunity: Streamline and improve the integration of the Neighborhood Efficiency Explorer, Water Use Efficiency Report and Customer Segmentation tools.

Commercial, Industrial and Institutional Water Use Benchmarking Analysis

1. Complete a review of completed studies and documentation on water use by CII customers.
2. Working with Statewide DAT identify appropriate classification level of CII customers.
3. Using tools piloted in Moulton Niguel Water District study and classify a representative sample of CII customer for member agencies (additional funding required for classification data required in the range of \$8k-10k).
4. Pool data to analyze water use characteristics of identified CII customer classification.
5. Compare with other analysis and documentation and present preliminary findings to Statewide DAT.
6. Finalize findings in a final report.

Additional Opportunity: integrate into visualization tools

Estimated CaDC staff time involved:

- Project Manager: 150 hours to conduct review of existing studies, coordinate ongoing activities and summarize final report.
- Data Scientist: estimated 320 hours to mature the CII categorization pipeline
- Interns / Research Fellows: used to conduct preliminary experimentation with supplemental data sources.

Statewide Data Reporting Requirements

1. Identify and classify all statewide reporting requirements completed by water suppliers
2. Identify any overlapping or conflicting data requirements
3. Working with Statewide DAT develop a questionnaire about reporting requirements and assumptions
4. Deploy a survey to water suppliers across California on data reporting and assumptions
5. Review results with Statewide DAT
6. Identify opportunities for streamlining data reporting
7. Provide final report to the DAT/Steering committee

Estimated CaDC staff time involved:

- Project Manager: 160 hours to coordinate investigation of current reporting and development of survey.
- Data Scientist: estimated 40 hours to identify overlapping or conflicting data requirements.



- Interns / Research Fellows: could be utilized to conduct follow up on survey similar to water rate survey and identify additional regional, state and federal reports.

Statewide Outdoor Water Use

1. Using monthly water use data for all CaDC utilities to estimate indoor and outdoor water use.
2. Use AMI data from EMWD and MNWD to refine estimate.
3. Using best available landscape area information to evaluate water used per area of landscaped
 - Work with DAT to refine landscape information
4. Evaluate and compare pre and post drought/conservation outdoor water use
 - Can conservation program participation data be incorporated into this?
5. Estimate total statewide water and energy savings with different conservation efforts
6. Synthesize research and analyses from local water utilities and academic research
 - a. Ongoing academic studies
 - b. Ongoing local utility analyses
 - c. Other studies from Alliance for Water Efficiency (“AWE”), Water Research Foundation (“WRF”) and other industry associations.
7. Report to Statewide DAT and Steering Committee

Estimated CaDC staff time involved:

- Project Manager: 200 hours to conduct review of existing studies, coordinate ongoing activities and summarize final report.
- Data Scientist: estimated 500 hours to implement monthly metered use indoor / outdoor segmentation and AMI end user study.
- Interns / Research Fellows: used to explore related but tangential research questions.



- Software tools to inform planning and analysis. CaDC tools make use of agency and external data to assist staff with tasks like understanding water efficiency in their service area, analyzing the water savings of water efficiency rebates, and forecasting the impact of water rate changes.
- Unique inter-agency database of cleaned and standardized metered water use and rebate participation data. These data allow researchers from world class institutions to advance the state of knowledge in the water industry. The scope and diversity of CaDC membership makes this a particularly effective data set for investigating issues like pricing, messaging, and the effectiveness of water efficiency programs.

In addition to the foundational work of the CaDC listed above, specific projects are selected by the membership each year as priority focus areas. This year's scope of work includes three focus areas:

1. Streamlining statewide data reporting
2. Applied research partnerships
3. Empowering management decisions with CaDC analytical tools

The first of these is a newer focus area that has increased in importance alongside the administrative burden placed on local agencies by regulatory bodies. The other two were chosen as focus areas in order to capitalize on previous investments and increase effectiveness in two of the CaDC's core competencies.

Streamlining Statewide Data Reporting

By the close of FY18-19, the CaDC will have surveyed statewide reporting requirements completed by water suppliers. The primary motivation of this survey and the analysis of its results is to identify opportunities for creating a more streamlined reporting process.

In FY19-20, the CaDC will use the results from that work to inform a series of more detailed user interviews with staff from local and state agencies as well as consultants involved in preparing and submitting reports. These interviews will dive into the process of extracting and formatting data for submission, coordination within and between organizations, common misunderstandings, errors in submission, and other pain points in the current reporting environment.

The results of these interviews will be used to inform a series of recommendations for streamlining reporting as well to inform future CaDC prototypes. If feasible, prototype data



pipelines will be tested that transform data already maintained by the CaDC (or available through novel, low cost collection technologies like the OWRS survey), and automatically output tables in formats required by different State reports. This will allow utility staff focus on the more strategic and narrative components of plans and reports.

Specific items include:

1. In depth user research to understand the current ecosystem for reporting to the state.
2. Evaluating the compatibility of CaDC data for the purposes of state reporting. For example, which items in each report could be derived from the data the CaDC currently maintains?
3. Evaluating the potential for automated reporting.
4. Designing prototype data pipelines to export this data in the proper format required by the reports and making this accessible to member agency staff.
5. Summarizing results in a recommendation report highlighting opportunities for improvement and outlining potential new reporting paradigms.
6. Raising awareness and increasing participation in the effort to streamline reporting among stakeholders statewide.

Estimated CaDC staff time involved:

- Project Manager: 300 hours to research user needs and current practices, coordinate project stakeholders, and synthesize results.
- Data Scientist: 180 hours to research user needs and current practices, and design prototype data pipelines.

Applied Research Partnerships

Facilitating applied research and data sharing has been central to the CaDC vision since the project's inception. CaDC staff propose to continue and build off this work in a number of ways.

Foremost among these will be pursuing the creation of pre-qualified research centers with simplified access to the CaDC data warehouse. These centers will be chosen for their high-quality research and dedication to data privacy. One of the requirements for pre-qualification will be adherence to a process of review and approval called the "CaDC Research Data Sharing Protocol" to be determined by the Steering Committee.

One collaboration with high potential value is with Professor Antonio Bento and the USC Center for Sustainability Solutions. Professor Bento is dedicated to this partnership and has a team of enthusiastic researchers behind him. A partnership with USC opens up a window not only to the university's world-class researchers, but also to the possibility of accessing the



resources of the California Research Data Center at USC. This center facilitates secure access to high quality statistical microdata that, when combined with CaDC partner water use and rebate data, has the potential to enable unprecedented insight into the drivers of water efficient behavior.

Specific items include

1. Support of ongoing research efforts including
 - a. Effectiveness of Increasing Block-Rate Pricing - *Resources for the Future*
 - b. Property Tenure and Sensitivity to Price and Non-Price Instruments - *UC Santa Cruz*
 - c. Classification and Benchmarking of Commercial, Industrial, and Institutional Water Customers - *New York University*
2. Expanding on the CaDC's current data sharing framework to simplify the approval process for pre-qualified researchers and research centers.
3. Continue development of new and existing research partnerships.
4. Working with the ad hoc Research Committee to review current research projects.
5. Promotion of CaDC research among the local and regional agencies to generate interest and increase the value of CaDC research.

Estimated CaDC staff time involved:

- Project Manager: 200 hours to establish research partnerships and promote research.
- Data Scientist: 100 hours to assist researchers with data exports and improve the usability and security of the CaDC data warehouse for researchers.
- Interns / Research Fellow: Hours to be determined as research opportunities unfold.

Empowering management decisions with the CaDC's analytical tools

Analytical tool development is a core competency of the CaDC and our tools continue to improve by integrating feedback from the CaDC Data Action Teams. FY 18-19 has seen several dramatic technical improvements that leave the CaDC well positioned for the coming year. These recent improvements include 1) technology to automatically calculate water savings performance metrics for water efficiency programs and individual customers and 2) migration to a more robust underlying software framework that enables analyses that were not previously possible, including the ability to drill down to individual customers and rebates.

In FY19-20, we will expand these tools to include new functionality as determined by the appropriate data action teams, and also put a greater emphasis on sharing these tools and their outputs with decision makers. To successfully accomplish this last point, CaDC staff will provide the option for on-site “data dives” with member agencies entailing focused instruction and advocacy on the use of CaDC tools, as well as 40 hours of custom work on an applied problem of the agency’s choice.



Specific items include

1. “Data dives” that put members of the CaDC data team on site at member agencies to increase awareness of the value and proper use of CaDC tools and how they can be tailored to the unique circumstances of member agencies.
2. Up to 40 hours of CaDC staff time devoted to a custom project determined by the member agency.
3. Expansion of current tools to include evaluation of water efficiency in disadvantaged communities.
4. Expanded capacity for analyzing rebate program participation trends.
5. Promotion of CaDC tools to increase interest in the CaDC and drive growth in membership

Estimated CaDC staff time involved:

- Project Manager: 16 hours per month conducting on-site “data dives”. 20 hours per month deploying and maintaining existing tools.
- Data Scientist: 16 hours per month conducting on-site “data dives”. 20 hours per month deploying and maintaining existing tools. 40 hours per month developing new features as requested by agency partners.
- Interns / Research Fellow: opportunity to develop prototypes of experimental ideas.



California Data Collaborative

Fiscal Year 2020-2021 Scope of Work

This document summarizes the California Data Collaborative (CaDC) scope of work for the fiscal year 2020-21. This coming year will continue to build on progress made since the founding of the CaDC in January 2016. In these three years, the project has established a firm organizational foundation that supports continued growth and development.

The foundation of the CaDC is discussed below to emphasize a baseline level of services provided with every CaDC membership. The FY 20-21 scope of work thus includes work required to operate and maintain the foundational services described below as well as work required to provide new benefits and improve on existing offerings.

The foundation of the CaDC includes:

- A governance structure centered on a Steering Committee composed of representatives of each CaDC member agency. The Steering Committee meets quarterly and sets the overall direction for the CaDC and has final say over the organization's actions.
- Active working groups - known as "Data Action Teams" - focused on subject areas such as water use efficiency, finance, and business development. These Data Action Teams form the on-the-ground heart of the CaDC where analytical tools and other work products are designed and tested.
- Dedicated project staff with expertise in software development and applied analytical problem solving. CaDC staff operate and maintain data infrastructure, develop and deploy analytical tools, and engage in direct problem-solving sessions tailored to the needs of each agency.
- State-of-the-art data platform for the integration of metered water use and rebate participation data. Agency data is pulled into the CaDC data platform where it is standardized and enriched with additional context like evapotranspiration and demographic data from the American Community Survey.
- Software tools to inform planning and analysis. CaDC tools make use of agency and external data to assist staff with tasks like understanding water efficiency in their service area, analyzing the water savings of water efficiency rebates, and forecasting the impact



of water rate changes.

- Unique inter-agency database of cleaned and standardized metered water use and rebate participation data. These data allow researchers from world class institutions to advance the state of knowledge in the water industry. The scope and diversity of CaDC membership makes this a particularly effective data set for investigating issues like pricing, messaging, and the effectiveness of water efficiency programs.

In addition to the foundational work of the CaDC listed above, specific projects are selected by the membership each year as priority focus areas. This year's scope of work continues the primary focus areas from the previous year:

1. Streamlining statewide data reporting
2. Applied research partnerships
3. Empowering management decisions with CaDC analytical tools

The first of these is a newer focus area that has increased in importance alongside the administrative burden placed on local agencies by regulatory bodies. The other two were chosen as focus areas in order to capitalize on previous investments and increase effectiveness in two of the CaDC's core competencies.

Streamlining Statewide Data Reporting

During FY 19-20, the CaDC conducted interviews with staff from both local and state agencies to gain a deeper understanding of the current system of water data reporting, including elicitation of the limitations of the current reporting system. These limitation have been outlined in a draft whitepaper "A Human-Centered Approach to Streamline Water Data Reporting in California" alongside recommendations for how to move the reporting ecosystem forward to achieve better outcomes for all stakeholders.

In FY20-21, the CaDC will continue to advance the interests of its members for streamlined reporting by building on the work in the previous year. The most ambitious path outlined in the whitepaper is for the creation of a new reporting platform to centralize data submission related to urban supply and demand. While the creation of this platform is outside this scope of work, the CaDC will pursue outside funding from foundation, state, and federal sources to enable the design and development needed to realize this vision. The CaDC will also continue to serve as technical advisors for efforts to streamline reporting by leveraging our technology, design, and domain expertise, including by participating in state working groups and contributing to work led by other nonprofit water industry organizations.



The CaDC will explore options to integrate landscape area data gathered by the state as part of SB606 & AB1668 into CaDC Analytics, as well as supporting CaDC members with understanding and using the data for their service area.

In addition to state reporting, the CaDC will also continue to develop ways to streamline the sharing of secure, anonymized data from retailers to wholesalers. This is discussed further below.

Specific items include:

1. Continue user research to understand the current ecosystem for reporting to the state.
2. Pursue external funding to develop a platform to streamline water data reporting.
3. Integrate landscape area data gathered by the state as part of SB606 & AB1668 into CaDC Analytics and support CaDC members with understanding and using the data.
4. Expand CaDC analytics to facilitate reporting of data between retailers and wholesalers.
5. Leverage CaDC technical expertise by participating in state workshops for data streamlining
6. Raising awareness and increasing participation in the effort to streamline reporting among stakeholders statewide.

Estimated CaDC staff time involved:

- Project Manager: 100 hours to research user needs and current practices, apply for funding, coordinate project stakeholders, and contribute to ongoing conversations.

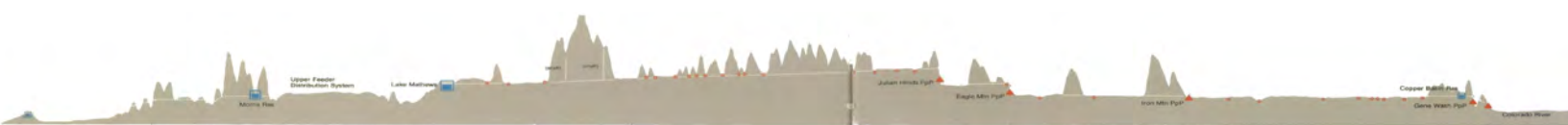
Applied Research Partnerships

Facilitating applied research and data sharing has been central to the CaDC vision since the project's inception. CaDC staff propose to continue and build off this work in a number of ways.

Foremost among these will be pursuing the creation of pre-qualified research centers with simplified access to the CaDC data warehouse. These centers will be chosen for their high-quality research and dedication to data privacy. One of the requirements for pre-qualification will be adherence to a process of review and approval called the "CaDC Research Data Sharing Protocol" to be determined by the Steering Committee.

Specific items include

1. Support of ongoing research efforts including
2. Expanding on the CaDC's current data sharing framework to simplify the approval process for pre-qualified researchers and research centers.
3. Continue development of new and existing research partnerships.



4. Promotion of CaDC research among the local and regional agencies to generate interest and increase the value of CaDC research.

Estimated CaDC staff time involved:

- Project Manager: 100 hours to establish research partnerships and promote research.
- Data Scientist: 100 hours to assist researchers with data exports and improve the usability and security of the CaDC data warehouse for researchers.
- Interns / Research Fellow: Hours to be determined as research opportunities unfold.

Empowering management decisions with the CaDC's analytical tools

Analytical tool development is a core competency of the CaDC and our tools continue to improve by integrating feedback from the CaDC members. In FY20-21, we will continue our agile development process to maximize the usability of our software through frequent user testing and rapid iteration. This agile process will determine the exact features that are implemented, though several areas have risen up as a high priority for future development.

First is the expansion of analytics offerings for wholesale agencies. Our goal is to streamline the sharing of aggregated, anonymized retail water use data with wholesale agencies to support informed planning. Second is the addition of improved intelligence features that identify relevant customer segments and insights without requiring detailed processing. Detailed filtering and segmentation will still be available for advanced users, but our goal is to simplify access to the most essential insights. Third, will be improved support for “self-service” analysis for advanced users. One implementation of this might be to allow users to build their own dashboards on top of cleaned, enriched CaDC data within a high-performance database.

Further work to improve the overall user experience will focus on decreasing loading times, updating users on the status of their data imports, and otherwise working to build user trust in the results of analysis.

Specific items include

1. Improve support for wholesale analytics and data sharing.
2. Simplify user interface with enhanced intelligence to identify relevant customer segments without extensive user effort.
3. Enhance support for “self-service” dashboard creation and analytics.
4. Continue integration between different cadc tools for a more unified and intuitive user experience.

Estimated CaDC staff time involved:



- Project Manager: 40 hours per month overseeing product development, conducting code review, testing new features, and supporting development.
- Data Scientist: 80 hours per month developing product and maintaining data pipelines.
- Designer: 40 hours per month creating designs, interviewing users and testing mockups





A Chapter of the Alliance *for* Water Efficiency

April 21, 2021

United States Department of the Interior
Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27133
Denver, CO 80225

I write on behalf of the California Water Efficiency Partnership (CalWEP) in support of the California Data Collaborative's (CaDC) proposal to the Bureau of Reclamation for a grant to fund a Data Platform for Urban Water Efficiency in California to assist local water suppliers with tracking, quality controlling, analyzing, and reporting their water production and demand data. We strongly support this grant application and the focus on improving the quality, availability, and usability of data to enhance water supply reliability, water efficiency, and drought management activities.

As a nonprofit membership organization with the mission to maximize urban water efficiency and conservation throughout California, CalWEP members have a strong interest in being able to evaluate the current efficiency levels of their customers, identify opportunities for improvement, share data for regional collaboration, and report trustworthy data for compliance. A modern software platform that does these things will allow suppliers in California to manage water demand more effectively while allowing them to adapt to changing water supply conditions.

As a partner in the pursuit of a water-efficient California, we acknowledge specific roles and responsibilities we will fulfill with respect to this grant. In the event this proposal is funded, we would expect our role in the Data Platform for Urban Water Efficiency in California project to include:

- Providing input to inform the design and functionality of the software platform.
- Testing the platform and providing feedback to ensure that it meets our member's needs.
- Supporting the dissemination of results and communication of the platform's benefits.

We look forward to working with you to enhance water supply reliability, water efficiency, and drought management activities by improving the quality, availability, and usability of data that are critical for effective water demand management.

Sincerely,

A handwritten signature in black ink that reads "Tia Leberz".

Tia Leberz
Executive Director, External Affairs
California Water Efficiency Partnership

STEVE BLOIS, PRESIDENT
DIVISION 5

RAUL AVILA, SECRETARY
DIVISION 1

ANDY WATERS, DIRECTOR
DIVISION 3



ANDRES SANTAMARIA, VICE PRESIDENT
DIVISION 4

SCOTT H. QUADY, TREASURER
DIVISION 2

ANTHONY GOFF
GENERAL MANAGER

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April 5, 2021

United States Department of the Interior, Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27133
Denver, CO 80225

RE: California Data Collaborative's Grant Application to USBR – SUPPORT

On behalf of Calleguas Municipal Water District (Calleguas), I am writing in support of the California Data Collaborative's (CaDC) grant proposal to the Bureau of Reclamation to fund a Data Platform for Urban Water Efficiency in California to assist local water suppliers with tracking, quality controlling, analyzing, and reporting their water production and demand data.

As an urban wholesale water supplier, Calleguas has a strong interest in being able to best utilize data from our member agencies to inform water resources planning. We also support the ability of our member agencies to evaluate the efficiency levels of their customers, identify opportunities for improvement, and report trustworthy data for compliance. A modern software platform that does these things will allow us to manage water demand more effectively in our service area while allowing us to adapt to changing water supply conditions.

As a member agency of the CaDC, we support the use of our annual membership dues as matching funds towards this grant. In addition, we acknowledge specific roles and responsibilities we will fulfill in this partnership. In the event this proposal is funded, we would expect our role in the Data Platform for Urban Water Efficiency in California project to include: 1) Providing input to inform the design and functionality of the software platform, 2) Allowing the data that we already share with the CaDC to be used to inform the software architecture, and possibly sharing additional data on a case-by-case basis, and 3) Testing the platform and providing feedback to ensure that it meets our needs.

We look forward to working with you to enhance water supply reliability by improving the quality, availability, and usability of data that are critical for effective water demand management.

Sincerely,

Anthony Goff
General Manager
Calleguas Municipal Water District



COACHELLA VALLEY WATER DISTRICT

Established in 1918 as a public agency

GENERAL MANAGER
Jim Barrett

ASSISTANT GENERAL MANAGER
Robert Cheng

CLERK OF THE BOARD
Sylvia Bermudez

ASSISTANT GENERAL MANAGER
Dan Charlton

April 21, 2021

United States Department of the Interior
Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27133
Denver, CO 80225

I write on behalf of Coachella Valley Water District in support of the California Data Collaborative's (CaDC) proposal to the Bureau of Reclamation for a grant to fund a Data Platform for Urban Water Efficiency in California to assist local water suppliers with tracking, quality controlling, analyzing, and reporting their water production and demand data. We strongly support this grant application and the focus on improving the quality, availability, and usability of data to enhance water supply reliability, water efficiency, and drought management activities.

As an urban retail water supplier required to comply with California's water efficiency framework established under Senate Bill 606 and Assembly Bill 1668 (2018), my agency has a strong interest in being able to evaluate the current efficiency levels of our customers, identify opportunities for improvement, share data for regional collaboration, and report trustworthy data for compliance. A modern software platform that does these things will allow us to manage water demand more effectively in our service area while allowing us to adapt to changing water supply conditions.

As a member agency of the CaDC, we support the use of our annual membership dues as matching funds towards this grant. In addition, we acknowledge specific roles and responsibilities we will fulfill in this partnership. In the event this proposal is funded, we would expect our role in the Data Platform for Urban Water Efficiency in California project to include:

- Providing input to inform the design and functionality of the software platform.
- Allowing the data that we already share with the CaDC to be used to inform the software architecture, and possibly sharing additional data on a case-by-case basis.
- Testing the platform and providing feedback to ensure that it meets our needs.

United States Department of the Interior
April 21, 2021
Page2

We look forward to working with you to enhance water supply reliability, water efficiency, and drought management activities by improving the quality, availability, and usability of data that are critical for effective water demand management.

Sincerely,

A handwritten signature in black ink, appearing to read 'KE', with a stylized flourish at the end.

Katie Evans
Director, Communications and Conservation

KE: kj\comm\katie\cadc
File: 0541.3

Kristin Bloomer, President (Division 5)
James Cioffi, Vice President (At large)
Joseph K. Stuart, Secretary-Treasurer (At large)
Patricia G. Oygur, Director (At large)
Paul Ortega, Director (Division 4)



Mark S. Krause, General Manager-Chief Engineer
Best, Best & Krieger, General Counsel
Krieger & Stewart, Consulting Engineers

April 14, 2021

United States Department of the Interior
Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27133
Denver, CO 80225

I write on behalf of Desert Water Agency in support of the California Data Collaborative's (CaDC) proposal to the Bureau of Reclamation for a grant to fund a Data Platform for Urban Water Efficiency in California to assist local water suppliers with tracking, quality controlling, analyzing, and reporting their water production and demand data. We strongly support this grant application and the focus on improving the quality, availability, and usability of data to enhance water supply reliability, water efficiency, and drought management activities.

As an urban retail water supplier required to comply with California's water efficiency framework established under Senate Bill 606 and Assembly Bill 1668 (2018), my agency has a strong interest in being able to evaluate the current efficiency levels of our customers, identify opportunities for improvement, share data for regional collaboration, and report trustworthy data for compliance. A modern software platform that does these things will allow us to manage water demand more effectively in our service area while allowing us to adapt to changing water supply conditions.

As a member agency of the CaDC, we support the use of our annual membership dues as matching funds towards this grant. In addition, we acknowledge specific roles and responsibilities we will fulfill in this partnership. In the event this proposal is funded, we would expect our role in the Data Platform for Urban Water Efficiency in California project to include:

- Providing input to inform the design and functionality of the software platform.
- Allowing the data that we already share with the CaDC to be used to inform the software architecture, and possibly sharing additional data on a case-by-case basis.
- Testing the platform and providing feedback to ensure that it meets our needs.

We look forward to working with you to enhance water supply reliability, water efficiency, and drought management activities by improving the quality, availability, and usability of data that are critical for effective water demand management.

Sincerely,

A handwritten signature in blue ink that reads 'Mark S. Krause'. The signature is fluid and cursive.

Mark S. Krause
General Manager-Chief Engineer
Desert Water Agency



April 19, 2021

United States Department of the Interior
Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27133
Denver, CO 80225

Subject: Support to the California Data Collaborative Proposal for the Data Platform for Urban Water Efficiency Grant to the Bureau of Reclamation

I write on behalf of Eastern Municipal Water District (EMWD) in support of the California Data Collaborative's (CaDC) proposal to the Bureau of Reclamation for a grant to fund a Data Platform for Urban Water Efficiency in California to assist local water suppliers with tracking, quality controlling, analyzing, and reporting their water production and demand data. We strongly support this grant application and the focus on improving the quality, availability, and usability of data to enhance water supply reliability, water efficiency, and drought management activities.

As an urban retail water supplier required to comply with California's water efficiency framework established under Senate Bill 606 and Assembly Bill 1668 (2018), my agency has a strong interest in being able to evaluate the current efficiency levels of our customers, identify opportunities for improvement, share data for regional collaboration, and report trustworthy data for compliance. A modern software platform that does these things will allow us to manage water demand more effectively in our service area while allowing us to adapt to changing water supply conditions.

As a member agency of the CaDC, we support the use of our annual membership dues as matching funds towards this grant. In addition, we acknowledge specific roles and responsibilities we will fulfill in this

Board of Directors

Philip E. Paule, *President* Randy A. Record, *Vice President* Jeff Armstrong Stephen J. Corona David J. Slawson

2270 Trumble Road • P.O. Box 8300 • Perris, CA 92572-8300

T 951.928.3777 • F 951.928.6177 www.emwd.org

April 19, 2021

Page 2

partnership. In the event this proposal is funded, we would expect our role in the Data Platform for Urban Water Efficiency in California project to include:

- Providing input to inform the design and functionality of the software platform.
- Allowing the data that we already share with the CaDC to be used to inform the software architecture, and possibly sharing additional data on a case-by-case basis.
- Testing the platform and providing feedback to ensure that it meets our needs.

We look forward to working with you to enhance water supply reliability, water efficiency, and drought management activities by improving the quality, availability, and usability of data that are critical for effective water demand management.

Sincerely,

A handwritten signature in black ink that reads "Paul D. Jones II". The signature is stylized and cursive.

Paul D. Jones II, P.E.

Eastern Municipal Water District

General Manager

PDJ:lva



6075 Kimball Avenue • Chino, CA 91708
P.O. Box 9020 • Chino Hills, CA 91709
TEL (909) 993-1600 • FAX (909) 993-1985
www.ieua.org

April 15, 2021

United States Department of the Interior
Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27133
Denver, CO 80225

I write on behalf of Inland Empire Utilities Agency in support of the California Data Collaborative's (CaDC) proposal to the Bureau of Reclamation for a grant to fund a Data Platform for Urban Water Efficiency in California to assist local water suppliers with tracking, quality controlling, analyzing, and reporting their water production and demand data. We strongly support this grant application and the focus on improving the quality, availability, and usability of data to enhance water supply reliability, water efficiency, and drought management activities.

As an urban wholesale water supplier, my agency has a strong interest in being able to access aggregate, anonymized data from our member agencies to inform water resources planning. We also support the ability of our member agencies to evaluate the current efficiency levels of their customers, identify opportunities for improvement, and report trustworthy data for compliance. A modern software platform that does these things will allow us to manage water demand more effectively in our service area while allowing us to adapt to changing water supply conditions.

As a member agency of the CaDC, we support the use of our annual membership dues as matching funds towards this grant. In addition, we acknowledge specific roles and responsibilities we will fulfill in this partnership. In the event this proposal is funded, we would expect our role in the Data Platform for Urban Water Efficiency in California project to include:

- Providing input to inform the design and functionality of the software platform.
- Allowing the data that we already share with the CaDC to be used to inform the software architecture, and possibly sharing additional data on a case-by-case basis.
- Testing the platform and providing feedback to ensure that it meets our needs.

We look forward to working with you to enhance water supply reliability, water efficiency, and drought management activities by improving the quality, availability, and usability of data that are critical for effective water demand management.

Sincerely,
INLAND EMPIRE UTILITIES AGENCY

Christiana Daisy, P.E., MBA
Deputy General Manager

Water Smart - Thinking in Terms of Tomorrow

Jasmin A. Hall
President

Michael E. Camacho
Vice President

Steven J. Elie
Secretary/Treasurer

Paul Hofer
Director

Marco Tule
Director

Shivaji Deshmukh
General Manager

April 21, 2021

United States Department of the Interior
Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27133
Denver, CO 80225

I write on behalf of Moulton Niguel Water District in support of the California Data Collaborative's (CaDC) proposal to the Bureau of Reclamation for a grant to fund a Data Platform for Urban Water Efficiency in California to assist local water suppliers with tracking, quality controlling, analyzing, and reporting their water production and demand data. We strongly support this grant application and the focus on improving the quality, availability, and usability of data to enhance water supply reliability, water efficiency, and drought management activities.

As an urban retail water supplier required to comply with California's water efficiency framework established under Senate Bill 606 and Assembly Bill 1668 (2018), my agency has a strong interest in being able to evaluate the current efficiency levels of our customers, identify opportunities for improvement, share data for regional collaboration, and report trustworthy data for compliance. A modern software platform that does these things will allow us to manage water demand more effectively in our service area while allowing us to adapt to changing water supply conditions.

As a member agency of the CaDC, we support the use of our annual membership dues as matching funds towards this grant. In addition, we acknowledge specific roles and responsibilities we will fulfill in this partnership. In the event this proposal is funded, we would expect our role in the Data Platform for Urban Water Efficiency in California project to include:

- Providing input to inform the design and functionality of the software platform.
- Allowing the data that we already share with the CaDC to be used to inform the software architecture, and possibly sharing additional data on a case-by-case basis.
- Testing the platform and providing feedback to ensure that it meets our needs.

We look forward to working with you to enhance water supply reliability, water efficiency, and drought management activities by improving the quality, availability, and usability of data that are critical for effective water demand management.

Sincerely,



Moulton Niguel Water District



THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

Office of the General Manager

April 19, 2021

United States Department of the Interior
Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27133
Denver, CO 80225

The Metropolitan Water District of Southern California's (Metropolitan) expresses its support for the California Data Collaborative's (CaDC) Fiscal Year 2021 Applied Science Grant Program application to fund the *Data Platform for Urban Water Efficiency in California* project. This platform will assist local water suppliers track, quality control, analyze, and report their water production and demand data. We strongly support this grant application and the focus on improving the quality, availability, and usability of data to enhance water supply reliability, water efficiency, and drought management activities.

As an urban wholesale water supplier, Metropolitan has a strong interest in accessing aggregated and anonymized data from our member agencies to inform water resources planning. We also support the ability of our member agencies to evaluate the current water use efficiency levels of their customers, identify opportunities for improvement, and report trustworthy data for compliance. A modern software platform will allow us to manage water demand more effectively in our service area while adapting to changing water supply conditions.

As a member agency of the CaDC, Metropolitan supports the use of our annual membership dues as matching funds towards this grant. In addition, we acknowledge specific roles and responsibilities we will fulfill in this partnership. In the event this proposal is funded, we would expect our role in the Data Platform for Urban Water Efficiency in California project to include:

- Providing input to inform the design and functionality of the software platform.
- Allowing the data that we already share with the CaDC to be used to inform the software architecture, and possibly sharing additional data on a case-by-case basis.
- Testing the platform and providing feedback to ensure that it meets our needs.

We look forward to working with you to enhance water supply reliability, water efficiency, and drought management activities by improving data critical for water demand management.

Sincerely,

A handwritten signature in black ink that reads "Brad Coffey".

Brad Coffey
Manager, Water Resource Management

Claudia Bill-de la Peña
Mayor

April 12, 2021

United States Department of the Interior
Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27133
Denver, CO 80225

I write on behalf of the City of Thousand Oaks, I am in support of the California Data Collaborative's (CaDC) proposal to the Bureau of Reclamation for a grant to fund a Data Platform for Urban Water Efficiency in California to assist local water suppliers with tracking, quality controlling, analyzing, and reporting their water production and demand data. We strongly support this grant application and the focus on improving the quality, availability, and usability of data to enhance water supply reliability, water efficiency, and drought management activities.

As an urban retail water supplier required to comply with California's water efficiency framework established under Senate Bill 606 and Assembly Bill 1668 (2018), my agency has a strong interest in being able to evaluate the current efficiency levels of our customers, identify opportunities for improvement, share data for regional collaboration, and report trustworthy data for compliance. A modern software platform that does these things will allow us to manage water demand more effectively in our service area while allowing us to adapt to changing water supply conditions.

As a member agency of the CaDC, we support the use of our annual membership dues as matching funds towards this grant. In addition, we acknowledge specific roles and responsibilities we will fulfill in this partnership. In the event this proposal is funded, we would expect our role in the Data Platform for Urban Water Efficiency in California project to include:

- Providing input to inform the design and functionality of the software platform.
- Allowing the data that we already share with the CaDC to be used to inform the software architecture, and possibly sharing additional data on a case-by-case basis.
- Testing the platform and providing feedback to ensure that it meets our needs.

We look forward to working with you to enhance water supply reliability, water efficiency, and drought management activities by improving the quality, availability, and usability of data that are critical for effective water demand management.

Sincerely,



Claudia Bill-de la Peña
Mayor

CC: Congresswoman Julia Brownley
Senator Dianne Feinstein
Senator Alex Padilla
James Crum, Van Scoyoc & Associates -jcrum@vasdc.com

cmo:660-40/CaDC USBR -Support/ml



Craig D. Miller
General Manager

Mike Gardner
Division 1

Gracie Torres
Division 2

Brenda Dennstedt
Division 3

Donald D. Galleano
Division 4

Fauzia Rizvi
Division 5



Securing Your Water Supply

April 21, 2021

United States Department of the Interior
Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27133
Denver, CO 80225

I write on behalf of Western Municipal Water District in support of the California Data Collaborative's (CaDC) proposal to the Bureau of Reclamation for a grant to fund a Data Platform for Urban Water Efficiency in California to assist local water suppliers with tracking, quality controlling, analyzing, and reporting their water production and demand data. We strongly support this grant application and the focus on improving the quality, availability, and usability of data to enhance water supply reliability, water efficiency, and drought management activities.

As an urban retail water supplier required to comply with California's water efficiency framework established under Senate Bill 606 and Assembly Bill 1668 (2018), my agency has a strong interest in being able to evaluate the current efficiency levels of our customers, identify opportunities for improvement, share data for regional collaboration, and report trustworthy data for compliance. A modern software platform that does these things will allow us to manage water demand more effectively in our service area while allowing us to adapt to changing water supply conditions.

As a member agency of the CaDC, we support the use of our annual membership dues as matching funds towards this grant. In addition, we acknowledge specific roles and responsibilities we will fulfill in this partnership. In the event this proposal is funded, we would expect our role in the Data Platform for Urban Water Efficiency in California project to include:

- Providing input to inform the design and functionality of the software platform.
- Allowing the data that we already share with the CaDC to be used to inform the software architecture, and possibly sharing additional data on a case-by-case basis.
- Testing the platform and providing feedback to ensure that it meets our needs.

We look forward to working with you to enhance water supply reliability, water efficiency, and drought management activities by improving the quality, availability, and usability of data that are critical for effective water demand management.

Sincerely,

A handwritten signature in black ink that reads "Robert A. Whipple".

Rob Whipple
Water Resources Specialist III