The Human Right To Water In Poor Communities Of Color

Urban Disadvantaged Community Water Systems In Southern Los Angeles County

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UCLA WATER RESOURCES GROUP

UCLA Luskin Center for Innovation

This report is dedicated to the memory of our late co-author, Michael Reibel

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ACRONYMS AND ABBREVIATIONS

AB	California Assembly Bill
Administrator	Interim Water System Administrator
CCF	Centum (One hundred) Cubic Feet — a measurement of water usage
Consolidator	Water system having capacity to serve clean, reliable, affordable water
CPUC	California Public Utilities Commission
DAC	Disadvantaged Community Water System
GIS	Geographical Information System
IOU	Investor-Owned Utility
IOU DAC/SDAC	An IOU that has a DAC or SDAC service area
IOU Non-DAC/SDAC	An IOU service area with the average household at the state median household income or higher
JPA	Joint Powers Authority
LADWP	City of Los Angeles Department of Water and Power
LAFCO	Local Agency Formation Commission
LIRA	Low Income Rate Assistance
MCL	Maximum Contaminant Level
MWD	Municipal Water District
MWDSC	Metropolitan Water District of Southern California
Non-IOU DAC/SDAC	A DAC or SDAC water system owned by a city, county water district, mutual water company or retail municipal water district
PD	California Public Utilities Commission Proposed Decision
SAFER	Safe and Affordable Funding for Equity and Resilience
Sativa	Sativa County Water District
SB	California Senate Bill
SDAC	Severely Disadvantaged Community Water System
State Water Board	California State Water Resources Control Board
TMF	Technical, Managerial and Financial Reports
Water System	Community Water System — any water system where people live
WRD	Water Replenishment District of Southern California

AUTHORS' NOTE

For the purpose of this report, the Authors acknowledge that we have not engaged extensively directly with residents in these communities. Therefore, we do not profess to fully understand or represent in this report how residents perceive problems with drinking water supply, affordability, and quality in the context of their daily lives. As we discuss in the body of the report, to advance sustainable solutions to drinking water system needs in the region, the experiences and expertise of residents need to be fully and permanently incorporated in future decision-making.

EXECUTIVE SUMMARY

Since the state enacted the Human Right to Water Legislation (AB 685) eight years ago, California has added more regulatory authority and more funding to help small disadvantaged or severely disadvantaged community water systems. The California Water Resources Control Board (State Water Board) can order mandatory consolidation to merge failing community systems with another, higher-functioning water system. The State Water Board is authorized to issue an enforcement order to mandate that water systems meet water quality standards. Other recent legislation authorizes the State Water Board to designate an Interim Administrator to manage the system, improve it, or consolidate the water system with another. The newly enacted Safer and Affordable Funding for Equity and Resilience (SAFER) drinking water program calls for annual appropriation of $130 million dollars for ten years to address the problems of disadvantaged community water systems.

This report identifies the 64 community water systems in Los Angeles County serving disadvantaged or severely disadvantaged populations. These 64 water systems have 281,000 connections, serving approximately 1 million people, nearly 10% of the population of Los Angeles County in 2019. The largest population is concentrated in 29 disadvantaged community water systems in Southern Los Angeles County who largely serve communities of color. The Legislature has appropriated funds for a separate risk assessment of the 29 disadvantaged or severely disadvantaged community water systems in this region.

The report then focuses on a case study of the Sativa County Water District, a failed community water system in Southern Los Angeles County, taken over by Los Angeles County as Interim Administrator. We examine the causes of failure, the risks to the customers, and the circumstances that precipitated action after many years of problems. We assess the progress towards improving the water system since the Administrator took over the system and the progress towards finding another community water system willing to acquire Sativa.

Then we move onto a broader analysis of the location and key characteristics of all community water systems in Southern Los Angeles County. This report examines the challenges that the 29 disadvantaged water systems face in providing clean, reliable and affordable water to their customers in this subregion. We then discuss whether consolidation is a potential solution for disadvantaged systems at risk of failing. We report the views that different stakeholders expressed about consolidation and other optional solutions for community water systems.

We consider which community water systems are potential consolidators — if they have the motivation, capacity, proximity, and comparatively affordable rates to take over a failed disadvantaged community water system. Finally, we make a series of recommendations, some for Southern Los Angeles County community water systems, and others for consideration with respect to the statewide program run by the

State Water Resources Control Board.

Findings

- Cities and special districts in this region have limited capacity to be consolidators of DAC/SDAC water systems. These water systems do not operate physically separated water systems and have little motivation to be a consolidator for an adjacent system. In smaller public water districts with elected boards, bringing in another water system may cause costs and rates to rise for their current constituents.

- On the other hand, bigger Investor-Owned Utilities (IOU) water systems operating in the region have the capacity and the motivation to become water system consolidators for disadvantaged community water systems that are at risk and need consolidation as they can add capital expenditures to rate base. Theoretically, they can also spread water rate increases across their service area networks in the region or the state, making the incremental costs of acquiring and improving another system lower per existing ratepayer. The IOU regulatory systems rewards water quality/supply investments with a nearly-guaranteed, healthy rate of return. The report analyses which IOUs would be good consolidators by considering location, distribution, and proximity to disadvantaged community water systems in the region.
- We then compared water system water rates between IOUs and disadvantaged community water systems, to find those that would make consolidation most affordable. We found that the IOU water rates for disadvantaged community service areas are much higher than the median rate for all Southern Los Angeles County water systems. Disadvantaged communities in IOU service areas pay **22%** more than the Southern Los Angeles County Average, and severely disadvantaged communities in IOU Systems pay **26%** more. Communities in IOU Systems at or above the State Median Household Income pay lower water rates, at the average water rate for Southern Los Angeles County.
- The cluster of disadvantaged community water systems are closest to or adjoining disadvantaged community water systems already served by IOUs with the highest rates. Those IOUs do not appear to be good candidates to serve as consolidators.
- It is not clear why the IOUs that serve the poorest communities charge the highest rates, nor why other IOUs charge less to higher income communities in the WRD. It may be because IOUs have a smaller average percent of connections served with much lower priced groundwater supply than other types of water systems. They buy imported water at higher water rates. However, that may not account for the entire difference in rates between IOUs serving poorer or higher income customers.
- There is limited eligibility for Low Income Rate Assistance for IOU DAC/SDAC customers. This means that the discounted water rate is not available to many disadvantaged households. Even after those rate reductions, rates in the highest rate IOUs remain high compared to the South-

ern Los Angeles County average.

- Only a few IOUs in Southern Los Angeles County provide water at a price on the lower or middle of the water rate range. With all other things equal, those few IOUs are likely to be the best consolidators for those DAC/SDAC systems that are failing and need consolidation.
- The California Public Utility Commission currently lacks authority to consider rate and other acquisition impacts on a Non-IOU water system proposed for IOU acquisition. This has implications for the ratepayers in a water system proposed for IOU acquisition.

Water Quality Issues in Southern Los Angeles County

Central and West Coast water basins underlying South Los Angeles County have areas where manganese levels are in high or moderate concentrations. Over the last ten years, grab samples taken at from water in Southern Los Angeles County show exceedances in manganese well above EPA Notification Level. This advisory is set because of potential neurological impacts. Most median-income water systems with manganese voluntarily install treatment at the water source, whereas disadvantaged water systems cannot afford this without grants. Untreated manganese can accumulate in the pipe distribution system. Preventing the accumulated pollutants from moving from the distribution system to customers' taps takes expert, certified water systems operators to properly flush the pipeline system regularly and replace dead-end pipes. The poorest systems have difficulty paying for water system operators that have this expertise.

The Sativa County Water District Case Study is a primary example of the kinds of water quality problems caused by manganese. In addition, the case study showed that the District had many other water supply and infrastructure problems for a long time. It took at least 15 years for an emergency to trigger dissolution of the Sativa County Water District. Legislation has passed to identify systems that are moving towards failure earlier, to stave off the accumulated problems. This report provides recommendations to help responsible agencies obtain earlier information and deploy a wider range of strategies to help water systems that need help before system deterioration yields overwhelming financial or quality consequences.

Key Recommendations

- The State Water Board should Increase the priority of manganese as a risk indicator when levels at the well or at the tap exceed advisory notification level for manganese. The State Water Board should continue to fund manganese treatment systems in disadvantaged water systems and ensure that they have adequate expertise to operate and maintain the treatment system.
- Wherever possible, California Water Quality Control Board-appointed Water System Administrators should use competitive bidding to select a consolidator for a DAC/SDAC System.
- The California Water Quality Control Board should continue to work with parties interested in approaches other than physical consolidation to improve out of compliance or at risk water

systems. This can include a larger organization serving pooled services to disadvantaged water systems.

- When an IOU is acquiring disadvantaged water system, Administrators need to ensure that acquisition agreements protects the interests of the to-be acquired water systems ratepayers prior to submittal to the California Public Utility Commission (CPUC).
- When there are many disadvantaged water systems at risk in a single county, the State Water Board, the County, and larger water agencies should consider creating a Joint Powers Authority (JPA) to be the Administrator for all disadvantaged water systems with problems countywide. This report includes a conceptual proposal for a JPA to take on these functions.
- If this voluntary approach for a JPA does not work, the State should reconsider approaches like the Countywide Small Water System Authorities proposed in 2019 in SB 414 (Caballero).
- The Legislature appropriated $800,000 for a Disadvantaged Community Water System Risk Assessment to for the Water Replenishment District of Southern California (WRD). When the WRD does this risk assessment, disadvantaged water systems need to trust WRD enough to share their financial, infrastructural, and other information. The WRD also needs to share assessment results with residents, community-based organizations, and the county or cities that represent the voters within the WRD. WRD needs to do this without losing the cooperation of the water systems who will not want to share their financial and infrastructure data widely.

BACKGROUND AND INTRODUCTION

Drinking water systems across the U.S. face huge challenges to harness the skills and resources to provide reliable, clean water to customers in the 21st century. We focus on the particular challenges faced by smaller water systems in urban disadvantaged communities that are struggling to meet the basic needs of their customers. We examine a part of Los Angeles County, Southern Los Angeles County, which has many smaller retail water systems, many of which have existed since farming communities and settlers established small towns. Now, this area is home to a cluster of poor communities served by older, small retail water systems. We examine the spatial distribution of water systems across this area, their disadvantaged status, governance types, water supply sources and cost, the number of connections served, and normalized water rates.

There is a broad push, both nationally and in California, to reduce the number of water systems through consolidation. The goal is to achieve economies of scale and better capacity to oversee fewer, larger systems. That conversation applies to Los Angeles County, the largest metropolitan area in the country with 210 separate retail water providers. We use the case study of Southern Los Angeles County and the example of one flagrantly-failed system to:

- Document what happened in the case of the Sativa County Water District crisis in Southern Los Angeles County.
- Illustrate that the location of any one system in relationship to others in a region is key to understanding options for improving governance, resilience of supply and affordability through consolidation.
- Describe and apply the attributes of a good "consolidator" water system — one that is both motivated and suited to acquire another water system.
- Examine indicators of small water system needs and risks where available.
- Describe, in a limited way, perspectives of stakeholders in the small water systems in Los Angeles County and its subregion.
- Evaluate the effectiveness of consolidation as a solution for the problems of small water systems, as well as other alternatives to help small systems to serve their customers at an affordable rate.
- Suggest how oversight agencies and other stakeholders might predict and act earlier on future water systems failures. Early intervention reduces the liability and cost to solve problems.

A. Nationwide Challenges for Drinking Water Suppliers

Urban public drinking water systems across the United States are facing huge challenges. First, water supply is more unpredictable than ever due to climate change. Increased temperatures exacerbate

the effects of drought by reducing snowpack in favor of precipitation (Sun et al., 2019) and increasing both evaporation and evapotranspiration of water by plants (Overpeck, 2020). Climate change is increasing weather extremes, with longer droughts and more frequent extreme flooding in between (Swain, 2018). Reduction in surface water flows during dry years results in increased groundwater pumping. Pumping in many basins greatly exceeds sustainable yield and the groundwater basins are shrinking as pumping causes land subsidence (Thomas, 2019). California has many groundwater basins in overdraft and subsiding.

Second, there are 51,000 regulated community water systems in the United States (Dig Deep, U.S. Water Alliance, 2019). This only includes water suppliers for retail customers, *not* water importers, wholesale water agencies, water and wastewater treatment utilities, stormwater utilities, and watermasters for rivers and groundwater basins. A good number of retail water suppliers were established decades or even more than a century ago. About 2,900 regulated community water systems exist in California alone, ranging from systems that serve only fifteen or fewer mobile homes to ones that serve millions of residents.

Third, without the continued infusion of massive federal funding that supported development of local drinking water system infrastructure in the mid-20th century, many systems have not adequately invested in infrastructure replacement and upgrades. Smaller water systems often do not have capital improvements programs to address infrastructure replacement and upgrade, along with financial reserves or financing for regular investments and preventative maintenance. Most of the smaller systems in poor communities only react when infrastructure breaks or needs repair or replacement (Naik & Glickfeld, 2017). “The American Water Works Association estimates that American drinking water systems need to invest $1.7 trillion in infrastructure over the next 40 years. The Environmental Protection Agency’s needs survey estimates the United States requires $271 billion for wastewater and stormwater needs over the next 20 years” (Dig Deep, U.S. Water Alliance, 2019). Both of these studies call for massive investments by the federal government —investments that, so far, are not forthcoming.

Fourth, and finally, water system management was simpler and less expensive in the 20th century than now. Now, source water often comes from a distance at a high price. Energy costs of moving that water have risen dramatically and now there are many more pollutants to treat when it arrives (Sedlak, 2014). Treatment technology is evolving so that recycled water can meet potable drinking water standards. Larger water systems are employing smart water management software and the experts to use these tools. Contemporary retail water systems are now responsible for developing and operating water treatment systems for their raw water supply or purchasing higher cost treated water from others. There is more regulatory oversight and compliance cost. With decreasing water supply and increasing water supply costs, retailers must also deliver water efficiently without undue leakage, helping customers to conserve water while maintaining fiscal health. The managerial,

financial, and technical capacity to do all of this is a major challenge for small water systems, particularly small systems that serve poor communities (Shih et al., 2004).

B. Special Issues for Southern California Community Water Supply Systems: Costs, Quality, and Reliability

In Southern California, a portfolio of different water sources is necessary to assure consistent water reliability. When one source is less available, others are available to make up the difference. Imported water, which has been key for Southern California's growth for over a century, has become less reliable because of climate change (Overpeck, 2020; Sun et al., 2019) and of lower quality because of increasing agricultural, industrial, and urban stormwater pollution in source watersheds (Chaundry & Malik, 2017; National Research Board, 2009). New sources of local water, such as highly treated wastewater and stormwater capture, are part of a water reliability portfolio, given the decreasing reliability of imported water supplies. However, these alternatives come with a cost (Cooley et al., 2019). Developing new water sources is an investment that requires capital and the ability to raise rates where necessary, manage and operate new capital projects, and obtain new expertise. Once again, this is extremely difficult for small water systems in poor communities.

In places like California, with short rainy seasons and long dry seasons, vast amounts of water must be stored in the wet season and used in the dry season. Snowpack has provided California with natural storage, but with climate change, snowpack is less reliable, and precipitation is more often coming as rain rather than snow (Sun et al., 2019). As the proportion of snowpack declines and precipitation increases, groundwater storage and surface storage are the key to water storage. As climate change warms the planet, water in surface storage will be subject to more evaporation and water pollution will be a greater challenge.

The complexity of emerging water sourcing techniques, treatment technology, and a dynamic water table require that a modern water system have a healthy rate base and the ability to obtain funding from state and federal grants as well as public and private financing to support improvements. It also requires greater local capacity to design, build, and operate new facilities as well as maintain and monitor system water flow and quality. A successful water system needs a highly qualified workforce with diverse expertise.

Meanwhile, the divide between small and large water systems and high and lower rate base community water systems grows wider. At the bottom, there is likely to be lower water reliability and water quality for water systems that are either too small or too poor to meet today's water challenges.

DISADVANTAGED COMMUNITY WATER SYSTEMS IN CALIFORNIA

A. Rural and Urban Disadvantaged Water Systems

Rural Disadvantaged Water Systems (DACs) have received much recent attention by state government, by the popular press, in grey literature[1] and peer-reviewed articles. DACs are water systems serving a customer base with a median household income at 80% of the statewide median household income. Severely Disadvantaged Water Systems (SDACs) have a customer base with a median household income that is 60% of the statewide median household income.[2] Rural DAC and SDAC systems are mainly spatially isolated or "island" communities (PolicyLink, 2013).

In California, small rural water systems are generally in agricultural counties where one of the major groundwater pollutants is nitrate. Nitrate contamination plumes from agricultural fertilizers, dairies and confined animal facilities are present in many rural groundwater basins, polluting well water. Groundwater pumping by farmers has left the shallow wells of poor community systems dry, particularly during the California drought from 2011 to 2019.[3] In agricultural areas, groundwater is often the only drinking water option for rural DACS, with surface water rights mostly owned by farmers, irrigation districts and a few cities. Estimates suggest 1,000,000 people in more than 300 rural communities and schools have lacked safe tap drinking water for over a decade due to nitrate and other pollutants (California State Water Resources Control Board, 2019a).

Despite the decade of focus on the problems of rural water systems, it is only recently that the press, public and decision makers have learned that small disadvantaged community water systems also exist in urban areas of the state (Reibel et al., 2020). Community water systems in urban areas have functioned mainly outside the public eye. If people in Los Angeles County think about who serves them water at all, many think they get their water from the City of Los Angeles' Department of Water and Power (LADWP), one of the largest water systems in the United States. LADWP does serve over 4 million people, but not the other 6.1 million living in Los Angeles County who get water from 209 other water systems. Now, national publicity around one failed urban Los Angeles County water system has led to growing recognition of the many water systems in Los Angeles County and that access to clean and reliable water is not equal across these systems (Real, 2019).

[1] Grey Literature includes publications that are not peer reviewed, including reports by government, private and nonprofit organization reports, policy statements, issues papers, and conference proceedings.

[2] These definitions of disadvantaged communities come from federal and state law and are the yardstick to determine eligibility for capital and technical services/training funding. In California, Section 79505.5a of the California State Water Code and other applicable laws define disadvantaged communities this way. The California Health and Safety Code Section 116760.20(n) defines a ''severely disadvantaged community''. Legislation and appropriations as well as earmarked funding in three different capital bond acts have used this definition.

[3] U.S. Drought Portal for California, https://www.drought.gov/drought/states/california

STATE REGULATORY OVERSIGHT AND FINANCIAL ASSISTANCE FOR COMMUNITY WATER SYSTEMS IN CALIFORNIA

No single authority is responsible for all oversight of all the different types of water retailers. The degree of oversight varies greatly, by type of system, ranging from minimal oversight of mutual water companies to a great deal of oversight for privately owned IOUs. However, all water systems with more than 15 connections are subject to the water quality oversight by the State Water Board, and the smaller systems are subject to any locally enacted drinking water permitting regulations.

The State Water Board implements the Federal Safe Drinking Water Act[4] and state drinking water laws[5] by directly regulating all community water systems of 15 or more connections and enforcing statewide water quality standards. They also are responsible for awarding grants and loans to community water systems, mainly for building new or replacing old infrastructure. The State Water Board has two main divisions with direct responsibility to oversee all community water systems.

A. The Role of the State Water Board Division of Drinking Water

The State Water Board Drinking Water Division is responsible for regulating all water systems over 15 connections enforcing water quality standards in drinking water systems throughout the State. Under the Federal Safe Drinking Water Act, the State Water Board can implement the Maximum Contaminant Levels (MCLs) set by the U.S. EPA. Alternatively, the State can set their own statewide MCLs for federally designated pollutants as long as the MCL does not exceed or conflict with the federal MCL. The State Water Board requires that all public water systems with more than 15 connections obtain a permit to deliver drinking water to customers. The Division of Drinking Water coordinates with counties that opt to develop their own regulatory permits for water systems serving less than 15 connections. The State Water Board authority on water quality covers all aspects of a water system, from the water source to the individual property water meter. The local health department has authority over water system plumbing on private "premises" (Pierce et al., 2020a).

The State Water Board also sets the pollutant self-monitoring and reporting requirements at the water source to comply with water quality standards. In limited circumstances (e.g., lead, copper, and bacteria testing), they apply their authority to require water quality monitoring in the storage system, distribution system, or at the tap. The Division of Drinking Water prepares an annual compliance report on all public water systems over 15 connections (California Water Resources Control Board, 2020a). That report summarizes primary water quality exceedances at each water system for each pollutant that has an MCL.

[4] Safe Drinking Water Act. (TITLE XIV OF PUBLIC HEALTH SERVICE ACT as amended through P.L. 116-92, Enacted December 20, 2019

[5] Summarized in https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/lawbook/dwstatutes20190101.pdf

The State Water Board has the authority to require a community water system to improve water quality to meet the MCL for pollutants with a mandatory MCL when there are a number of exceedances. They have authority to fine public water systems that do not achieve the MCL. Solutions to water quality problems can involve changing the water source (e.g., a new well or improved, deeper well), treating the water source (a water treatment facility), or connecting to another water system with a clean or treated water source. Permits are required for any of these solutions. State Water Board drinking water permits are also required before a new water system serves drinking water. When a water system changes hands, the new owner must reapply for a permit.

The Legislature has repeatedly given the State Water Board more authority and more resources to oversee and assist those DAC/SDAC systems that are in trouble and do not have the financial or technical resources for solutions. Under SB 88 (2015),[6] they have the authority to require a consolidation of a community water system that repeatedly fails to meet water quality standards. Under this same legislation, the State Water Board has the authority to require another system to take on the failing system. However, despite this authority and the financial resources that the State Water Board has made available to help encourage consolidation, they must take many steps before ordering consolidation, and "it remains difficult to convince local officials and residents of the benefits of consolidation in specific instances" (Lai, 2017). In some cases, the costs of a physical consolidation is prohibitively high for available state funding resources.

B. The Role of the State Water Board Division of Financial Assistance

The Division of Financial Assistance provides grants and loans for capital funding to eligible water systems that have submitted sufficient Technical, Managerial, and Financial (TMF) Reports (discussed below). The Division of Financial Assistance runs grant and loan programs for infrastructure for all water systems that apply, compete, and qualify. In general, all public water systems with more than 15 connections are eligible for the grants and loans available from the State Water Board.[7] However, recent California capital bond acts and other appropriations reserve funds for DAC/SDAC water systems.

In order to grant funds to a DAC system, the Division of Financial Assistance must determine whether the median household income for residents served by the water system meets the DAC standard of 80% or the SDAC standard of 60% of median statewide household income.[8] For water system boundaries that do not follow census block boundaries, the Division uses a Geographical Information System (GIS) based on interpolation of median household income in the bisected census block

[6] SB 88, Chapter 27, California Statutes, 2015.

[7] Profit-making IOUs are only qualified to compete for grants or loans when the enabling legislation specifies that they are eligible. Recent Legislation (SB 200) gives the State Water Board authority to make grants to even smaller systems (between 10-14 connections), and they are assessing the possibility of granting funds to domestic wells below 10 connections. It is not clear how this legislation affects the State Water Board oversight of drinking water quality in water systems under 15 connections that has been delegated to the counties in the past.

[8] Id at Footnote 2.

groups inside the boundary.[9] Determination of median household income for the water system and a community survey of income levels is what qualifies water systems as eligible/not eligible for grant funding earmarked in legislation for DAC/SDAC systems.

1. *Locating Qualified Disadvantaged Community Water Systems: The Need for Accurate Water System Boundaries in Each County*

The Division of Financial Assistance uses the maps submitted by each water system in the state to calculate their DAC/SDAC status when they receive a grant application for disadvantaged water system funding. While all water systems have to submit boundary maps, neither the State Water Board nor counties have put all of these maps together to show all water systems in a County or statewide. The State Water Board is now undertaking a project to develop a new tool to calculate median household income for water system service areas. (O'Keefe, personal communication, July 7, 2020).

2. *SB 200: The Safe and Affordable Drinking Water Act*

The State Water Board Financial Assistance Division and the Drinking Water Division are responsible for administering the recently passed Safe and Affordable Drinking Water Act.[10] This legislation provided a one-year budget appropriation of $130 million, and then a subsequent ten years of appropriations from the Greenhouse Gas Reduction Fund[11] at $130 million per year. This bill provides the following types of funding for DAC/SDAC community water systems, plus smaller state small DAC/SDAC water systems and domestic wells.

- Capital funds for water system projects.
- A limited number of years of operating revenue to help a water system improve its technical, managerial and financial capacity.
- Technical assistance funding.
- Funds for the State Water Board to assess DAC/SDAC system risks, to systematically identify costs of solutions and rank grant application priority for funding.
- An advisory group to advise the State Water Board on the SAFER Program annual expenditure plan.
- Funding to compensate Water System Administrators when the State Water Board appoints one to take over all or a limited number of functions of a water system.

[9] See Reibel et al., 2020 for a discussion of the difficulty of accurately obtaining median household income averages for water systems, whose boundaries do not coincide with the census, and a proposed method, applied in this article to improve the accuracy of median household income determination for water systems.

[10] State Senate Bill 200 (Monning et al.). An act to add Section 53082.6 to the Government Code, to amend Sections 39719, 100827, 116275, 116385, 116530, 116540, and 116686 of, and to add Chapter 4.6 (commencing with Section 116765) to Part 12 of Division 104 of, the Health and Safety Code, and to add Chapter 7 (commencing with Section 8390) to Division 4.1 of the Public Utilities Code, relating to drinking water, making an appropriation therefor and declaring the urgency thereof, to take effect immediately.

[11] The Greenhouse Gas Reduction Fund was created as part of the California Cap and Trade Program: Statutes of 2005-6, Chapter 488, Division 25.5 (commencing with Section 38500) to the Health and Safety Code.

SB 200 requires the State Water Board to develop and issue an Annual Risk Assessment for DAC/SDAC water systems with fewer than 3,300 connections statewide.[12] The State Water Board is developing an Aquifer Risk Mapping Program to guide its analysis of risk. The State Water Board is also developing a cost assessment model to estimate the costs of types of capital projects proposed for funding.

3. Reporting on the Technical, Managerial, and Financial (TMF) Capacity of Water Systems

Currently, when a new water system is proposed, ownership of a water system changes, or an existing water system applies for a grant, the State Water Board can require a TMF Capacity Analysis.[13] The reporting requirements are very comprehensive. The main limitation is that assessment is required only when those occasions arise. The water system or its representative may prepare the report; an independent reviewer is not required. The other limitation is that the TMF Analysis does not evaluate the state of the physical infrastructure to measure technical capacity, nor does it require a full evaluation of total annual revenues versus total annual costs and indebtedness. The State Water Board's Needs Analysis Unit and contractors, including some of the co-authors of this report, are "mining" the Electronic Annual Report and other State Water Board data to calculate new TMF metrics. However, access to all of these metrics is not yet available to the public, and the Board effort notes that additional TMF metrics need to be collected in the future.

[12] The first white paper in a series from this effort is available here: https://www.waterboards.ca.gov/drinking_water/programs/safer_drinking_water/docs/draft_white_paper_indicators_for_risk_assessment_07_15_2020_final.pdf

[13] https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/TMF.html#TMF_Assessment

IV DISADVANTAGED COMMUNITY WATER SYSTEMS IN LOS ANGELES COUNTY

A. History of Local Water System Development

Los Angeles County started out as many freestanding farms, ranches, and mission lands with individual wells and river diversions. Then, small towns grew. As the towns grew, new lands were subdivided outside of towns into smaller lots for town development. By 1905, the USGS had mapped domestic and community wells, pumping plants, irrigated lands, and water system distribution lines for the Los Angeles County quadrangles (Johnson & Chong, 2005; Mendenhall, 1905).

This development pattern eventually grew together into a megalopolis (Hise, 1993). However, today this metropolis still has small town local government with 88 different cities in Los Angeles County and significant numbers of unincorporated communities.

From the early development of Los Angeles County to the present, many more, smaller local water systems were established than new cities. Many water systems organized when individual wells stopped yielding adequate water or as communities grew. A town, company, or group of homeowners would organize to dig deeper wells with greater capacity and bigger pumps. When a new subdivision was built, a well or series of wells would be drilled or rivers or creeks would be dammed or diverted, and a distribution system would be constructed. Before cities, private companies, nonprofit mutual water companies, or county water districts, discussed below, ran the water systems. Many times, towns became legally recognized cities after community water systems were already established (Bloomquist, 1992; Pincetl et al., 2016). Many of these early water systems are still delivering water today. A substantial number of the 209 existing water systems in Los Angeles County started as early as the late 19th century and early 20th century.

B. Accurate Mapping of Disadvantaged Water Systems

The State Water Board requires all water systems to submit their boundary maps. The State Water Board Division of Financial Assistance uses those boundary maps and census block data to estimate the median family income in community water systems, to identify those water systems qualifying for funding earmarked for DAC and SDAC water systems.

In a previous study, the authors used the State Water Board boundary shapefiles as the basis for a Los Angeles County Map of DAC/SDAC and Non-DAC Water systems. (Reibel et al., 2020). That study and others (Cope & Pincetl, 2014) found significant gaps and overlaps in boundaries. Some of these gaps may be areas with no water service, such as a utility right of way. However, they might also be an individual water system making a mapping error, which leaves territory out of the water system that is actually serving the area, or shows two systems serving the same area. These errors probably

occur because each water system may or may not know the boundaries adjacent systems are using, as there are no area-wide water system maps for them to check.[14]

Accurate countywide water system maps are important in determining the DAC/SDAC status of urban systems that abut each other. The differences between systems that have a DAC/SDAC median household income level or lower versus those having an average statewide median income often occur in dense urban areas. In urban areas, an accidental exclusion or inclusion of an area can make the difference as to whether a system is eligible or ineligible for DAC/SDAC funding. Efforts to eliminate gaps and overlaps in maps will reduce error in estimating the median household income for each water system.[15]

C. Different Types of Local Water Governance

Seven different types of water governance systems emerged over a long time in California. Each law establishing a type of water system allowed the governing entity to develop, operate, and maintain a water system, and gave them the authority to charge fees and rates for delivery of drinking water (Cope & Pincetl, 2014). This study will demonstrate that the capacity of water systems to deliver safe, reliable, affordable water is closely related to the type of system. Figure 1 shows the distribution of these types of systems in Los Angeles County. The types are described below:

> ***Cities:*** Cities may create a water department or form a municipal water utility. Some bigger cities have established semi-independent municipal water utilities run by an independent, appointed commission with a separate budget and revenues. Smaller cities tend to run their own water departments, directly governed by the city manager, mayor, and city council.
>
> In either case (a municipal utility or a department), city water agencies must hold public hearings before all significant decisions, such as determination of water rates, budget, bonded indebtedness, and major capital improvement projects. Half of the cities in Los Angeles County (44) run their own water system.

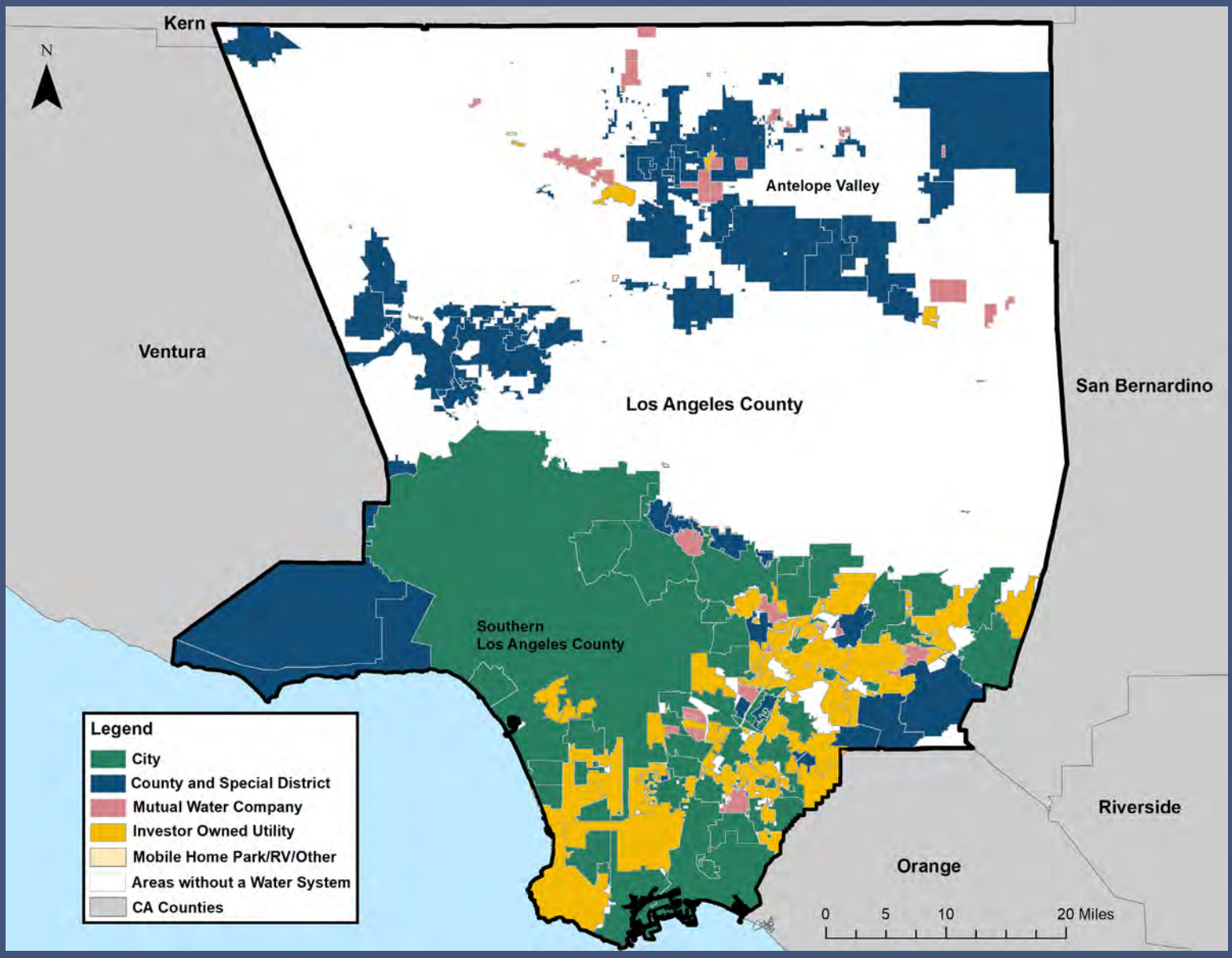
Other types of water systems are in parts of the cities with their own systems and in the other 44 cities. Some cities have two or three different water systems serving their communities. Unincorporated county communities have one or more of the other governance types shown in Figure 1.

> ***County Water Districts:*** County water districts are an early form of system governance, created before the legislature required approval of all special purpose districts by a countywidecommission. Residents in the proposed district could simply vote to create the water district.
>
> Some of these older county water districts persist, as a legacy, throughout California and Los

[14] These gaps show up on the maps used in this report as “white holes”. They are most clear in Figures 9 and 10.

[15] The mapping work for this report could not resolve the gaps and overlaps in mapping between all adjoining water systems in Los Angeles County. That needs to happen for all water systems that adjoin others, at the direction of the State Water Board. They would assemble boundary maps for all water systems in a county together, identifying gaps and overlaps and asking each water system to work with their adjoining systems to resolve and correct them.

Figure 1. Different Types of Local Water Governance in California and Los Angeles County



Source Data: Reibel et al., 2020

Angeles County. Residents elect a board of directors who can hire staff, hold public hearings to oversee the operation of the District, set water rates, and approve expenditures in annual budgets.

After 1963, new county water districts and dissolution/consolidation of county water districts came under the authority of the Local Agency Formation Commission[16] (LAFCO). LAFCO has some continuing oversight of all County Water Districts established before or since LAFCO was established. LAFCO can determine that a public (government) water system is not providing safe, affordable, and reliable water or is not acting in a lawful manner and vote to dissolve the system. However, they have limited authority, financial resources, and expertise to audit performance of established public water systems. Their authority to consolidate public water systems is limited to consolidation with another public water agency.[17] Because many private and nonprofit systems in the County are not under the authority of LAFCO, they have no authority to approve water system consolidation for or with non-public systems.

County Waterworks Districts: Los Angeles County has formed Waterworks Districts under a separate legislative authorization in three areas: the Antelope Valley, Marina Del Rey Harbor, and the Malibu/Santa Monica Mountains. The County Board of Supervisors, rather than an independent oversight board, directly oversees these districts. In effect, Waterworks Districts are financing mechanisms to establish rates, assessments, and charges for water customers and allocate staff and expenditures in different discrete areas of the County. This ensures that the customers of each separate Waterworks District are paying their share of the costs. The County Department of Public Works serves as staff to all of the Waterworks Districts.

Irrigation Districts: These districts originated in Los Angeles County's agricultural economy. Some of those began as early as the mid to late 18th century. Irrigation districts in Los Angeles County have now "repurposed" themselves as domestic drinking water providers as agricultural lands urbanized. They are public agencies with an elected Board that operate under the oversight of LAFCO, similar to cities and county water districts.

Municipal Water Districts: The Legislature created the Municipal Water District Act (Municipal Water Act, Statutes of 1963) known as the Knox Nisbet Act. There is only one Municipal Water District (MWD) in Los Angeles County that both acts as a wholesale water supplier and delivers water directly to retail customers — the Las Virgenes Municipal Water District. The other MWDs in Los Angeles County mainly purchase water from the Metropolitan Water District of Southern California (MWDSC) or the State Water Project and deliver and sell it to any of smaller water systems nested in their jurisdiction that opt to buy it.

[16] The Cortese Knox Local Government Reorganization Act became law in California in 1963. That law created Local Agency Formation Commissions in each county. Since that time, the law has been renamed, revised, and amended many times. (California Assembly Local Government Committee, 2019).

[17] Email Communication with Paul Novak, Executive Officer, Los Angeles County Local Agency Formation Commission.

The MWDs are government agencies with an independently elected Board of Directors. Each MWD that buys wholesale water from the MWDSC selects a designee to sits on the MWDSC Board. Two of these municipal water districts are the Central Basin Municipal Water District and the West Coast Basin Municipal Water District. Their boundaries are, respectively, the Central and West Coast Groundwater Basins, which, together, corresponds to the WRD boundary. Each MWD sells imported water to retailers nested in their boundary. MWDs have authority to provide water from other sources. In Los Angeles County, Central Basin MWD buys non-potable recycled water from the Los Angeles County Sanitation Districts and delivers it for use in parks, road medians, and other uses. The West Coast Basin MWD obtains treated non-potable water from the City of Los Angeles Hyperion Treatment and distributes it to industrial users. West Coast Basin MWD also plans to develop an ocean desalination plant to produce drinking water.

Nonprofit Mutual Water Companies: According to the California Association of Mutual Water Companies, as many as 965 mutual water companies own community water systems in California. These systems serve vacation communities and residential areas or are agricultural irrigation systems (A. Ortega, personal communication, January 8, 2020). Property owners can form mutual water companies or a property subdivider can form a company when or after land is platted, but before lots are sold. Each property owner with a property receives shares in the company after purchase. The shares run with the land. The mutual water company usually has its own well(s), pumps, and distribution system. Shareholders elect a Board of Directors to oversee management of the company. Renters are not eligible to hold office. However, legislation now requires public notice of meetings, and the meetings must be open to all members of the public, including renters.[18]

Mutual Water Companies have less governmental oversight. They must submit their articles of incorporation and list the distribution of shares in the company to the California Department of Corporations. However, that Department does not oversee the Mutual Water Companies. Mutual Water Companies are nonprofits and must report their income and expenses to the Internal Revenue Service (via an annual Form 990) and the California Franchise Tax Board. However, creation of a new mutual water company requires the approval of the State Water Board. The Board sets and enforces water quality standards for all water systems, including Mutual Water Companies. Mutual Water Companies must monitor water quality and submit testing results to ensure that water quality meets these standards. They must use certified water system operators and meet other drinking water system requirements.

Investor-Owned Utilities: Historically, private water companies have served water in many parts of California, including Los Angeles County. Originally, private water companies, like other water systems, were local and small. Separate companies owned water systems that served

[18] Assembly Bill 240 (Rendon) 2013. Mutual Water Company Open Meeting Act. This is quite important in Southern Los Angeles County that consists of older single-family homes and renter-occupied apartments.

one discrete service area. The 1912 Public Utilities Act made all private water companies regulated utilities under the Railroad Commission. The Railroad Commission was renamed the California Public Utilities Commission (CPUC) in 1945 (Hallett, 1912).

Now, private water companies are "Investor-Owned Utilities" (IOUs) regulated by the CPUC. IOUs have an exclusive right to be a retail water provider in particular service areas, with that right granted by the CPUC. There are many (around 80) small IOUs in California serving 500 or fewer connections. However, there are only four Class B IOUs serving between 2,000 and 10,000 connections, and eight Class A IOUs that serve more than 10,000 connections in California. More consolidations are pending[19] (California Public Utilities Commission, June 2020). Six Class A IOUs and one Class B IOU operate many separate service areas in Los Angeles County (California Water Association website, not dated).

IOUs have grown by acquiring smaller systems, or by being acquired by larger systems. Gradually, larger IOUs bought out many smaller companies, or the IOUs expanded into new geographical areas as California grew. That is how IOUs became state, national, and binational companies. Because of this, larger IOUs are set up to serve many geographically separate service areas with a centralized management. This is in contrast to public water systems that have a governance and operational strategy that relies on a single, contiguous geography.

The seven IOUs in Los Angeles County are widely distributed throughout the County and within the WRD. IOUs now serve an estimated quarter to a third of the geography of Los Angeles County developed areas. According to their websites, five of the seven IOUs serving Los Angeles County, are statewide or nationwide public companies with stockholders, while only two are local to Los Angeles County and privately owned. Most IOUs have some groundwater rights in Los Angeles County, allocated through the court adjudications of groundwater basins in the mid-20th century or purchased since then. (Porse et al., 2015).

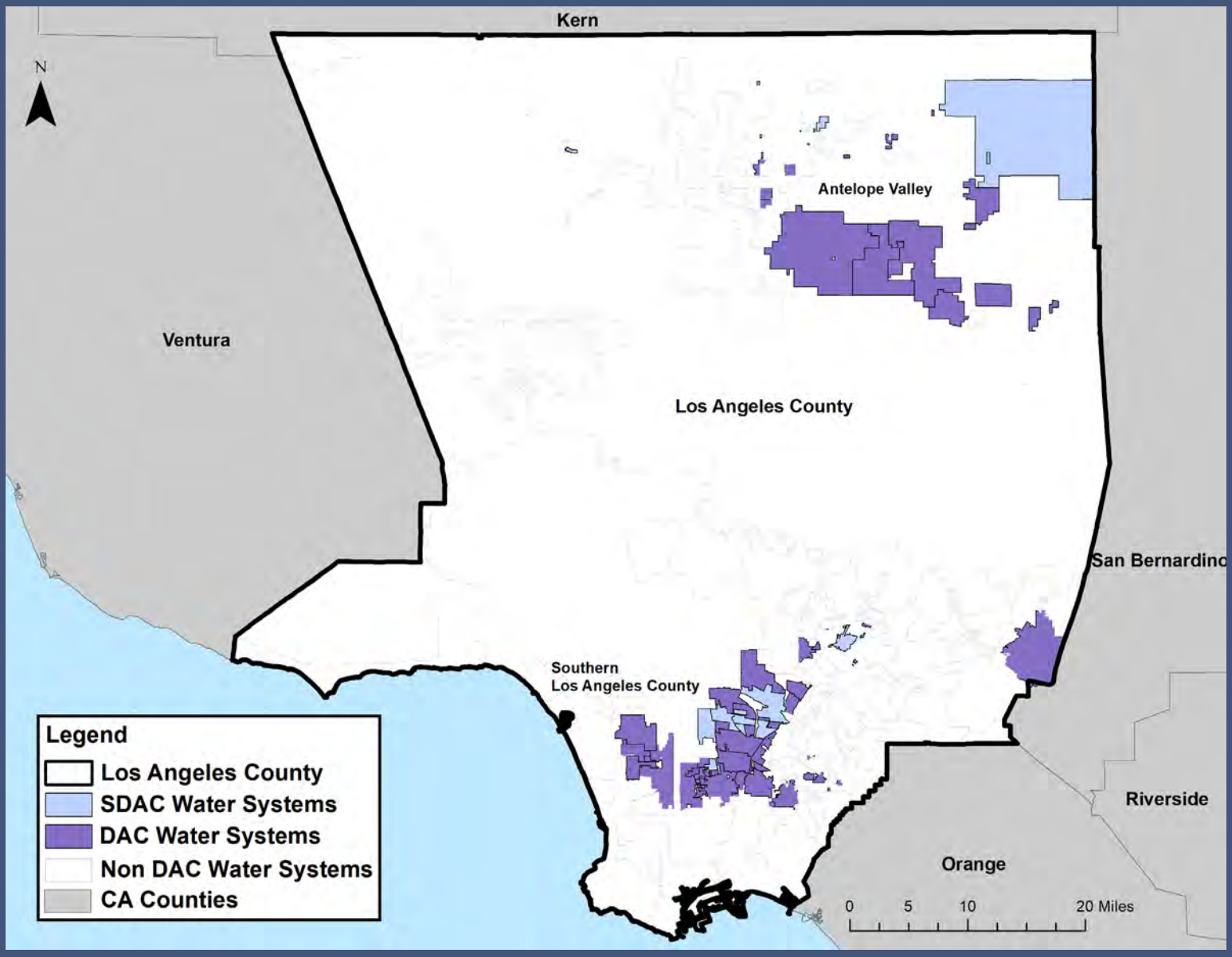
D. Identifying Los Angeles County Community Water Systems that are DAC/SDAC and Non-DAC

Earlier we describe the method that the State Water Board Division of Financial Assistance uses to estimate whether a water system applying for a grant has a median household income at or lower than 80% (DAC) or 60% (SDAC) of the statewide median household income to qualify. When applying that methodology at one time for all water systems in Los Angeles County, Reibel et al. found errors that could not have been revealed in individual system mapping (Reibel et al., 2020).[20] Reibel et al. created a new approach to estimate median household income for water systems that reduces error. The maps and DAC/SDAC designations in this report utilize the approach and product that

[19] California-American Water Company (Class A IOU) and East Pasadena Water Company (a Class B IOU in Los Angeles County) have a joint application before the CPUC to sell East Pasadena's assets to Cal-American (CPUC Application 20-04-003, June 2020).

[20] For instance, in straight interpolation results, some higher or mixed income coastal water systems were shown as DAC; other systems that were in low income communities did not qualify for DAC status.

Figure 2. Disadvantaged Community Water Systems in Los Angeles County



Source Data: Reibel et al., 2020

Reibel et al. produced in Los Angeles County. The result of the combined methodology is a more accurate water system median household income and more accurate designation of DAC/SDAC status (Reibel et al., 2020).

Figure 2 uses this methodology to identify and map all DAC/SDAC and Non-DAC water systems in Los Angeles County. However, the water systems boundary files still have the gaps and overlaps in mapping discussed above. That is beyond the scope of this project.

E. Which DAC/SDAC Community Water Systems in Los Angeles County Are at Risk or Failing?

Figure 2 shows all 209 community water systems in Los Angeles County. Those highlighted in white with gray boundaries are Non-DAC and those in purple or blue are DAC or SDAC. The distribution of DAC/SDAC water systems is concentrated in two areas of the County. The majority of low-income community water systems are clustered together in one part of Southern Los Angeles County. In the Antelope Valley, another group of isolated DAC/SDAC water systems is scattered in the periphery of the larger water system boundaries. There are low-income communities of color in both of these subregions.

Are the 64 DACs and SDACs in Los Angeles County able to deliver reliable, clean, and affordable water? One problem with answering this question is that it has been asked only recently for many different water systems across the Los Angeles County and the California.

A recent study examined all 200-plus water systems in Los Angeles County for water quality, water affordability, and water supply, as well as for technical, managerial, and financial capacity (Pierce & Gmoser-Daskalaskis, 2020). The authors developed a set of indicators for water quality, water supply reliability, water affordability as well as water system governing capacity. They identified publicly-available data that could represent each indicator. Even with limited data available in this first-time effort, the indicators showed some water systems with current problems in the Antelope Valley cluster in Northern Los Angeles County.

However, their data did not show as many current problems in the Southern Los Angeles County cluster. The State Water Board indicator for water quality is exceedances of primary pollutant water quality standards at the water source. Those are pollutants with a direct effect on human health. However, one water system in Southern Los Angeles County, Sativa County Water District, did fail, without a primary pollutant, in a very public way in 2018.

The Pierce and Gmoser-Daskalaskis report was a first attempt at a countywide risk assessment, by developing new indicators and measuring them with existing data. Analysis at this scale can highlight some, but perhaps not all, water systems that have problems delivering clean, safe, and affordable water. Indicators of risk used in this report are under review as part of a statewide annual assessment of risk in DAC/SDAC water systems.

The next section of the report is a detailed case study of the Sativa County Water District, now dissolved and under the interim management of Los Angeles County. This case study shows that urban DAC/SDAC water systems face different pollution, water supply, and water rates issues than those that rural systems need to address. This means that the risk and cost indicators needed to assess urban DAC/SDAC systems may be different from those that work for rural DAC/SDAC systems.

V

THE CASE OF SATIVA COUNTY WATER DISTRICT

Sativa County Water District (Sativa) is a severely disadvantaged community water system in Southern Los Angeles County that failed. It is the first water system taken over by a State Water Board-appointed Administrator in 2018. Sativa provided service to a part of the City of Compton and adjoining Willowbrook, an unincorporated area.

In the Sativa County Water District, the problems reached crisis levels that year when the system operators decided to flush the pipe system after complaints about the water. However, instead of flushing out accumulated sediment to the sewer system, they flushed concentrated sediments directly into the taps of residents. The residents were outraged, and elected local, state, and federal officials convened public meetings to hear about the problems. It was widely covered in the local and national media.

Subsequently, urgency legislation in 2018 authorized appointment of an Interim Administrator by the State Water Board[21] to take over management of the Sativa County Water District. The State Legislature appropriated $200,000 from the 2018-2019 State Budget to fund Administrator costs. Los Angeles County agreed to become Administrator in 2018, while the legislation was pending. In July 2018, after Los Angeles County agreed to take over the system, the Los Angeles County LAFCO voted to dissolve the Sativa County Water District (Jennings & Vives, 2018). Since dissolution of the Sativa County Water District, the Los Angeles County Waterworks Districts temporarily serves the community within Sativa's boundary as a part of the County. At the time of writing, Los Angeles County is still administering Sativa (Lafferty, 2020).

Sativa is a small water system by urban standards, serving 1,643 connections. All of its water supply comes from groundwater, where the water system has adjudicated groundwater rights adequate to serve its customers. While others in the water industry and some government agencies have known for some time that Sativa had financial, infrastructural, and managerial problems, it took years for public awareness and action. As stated by Paul Novak, Los Angeles County LAFCO Executive Director, "Taking steps to dissolve a water system (or any public agency), against the wishes of the agency's governing body, was something that the Local Agency Formation Commission for the County of Los Angeles was hesitant to do for many years." The Sativa governing board and staff were able to thwart action by LAFCO as early as 2005. LAFCO Board members at that time were also concerned how to find a new system owner to take over Sativa and whether the increased water rates to improve the system would overburden poor residents (Jennings & Vives, 2018).

This section will describe: (1) the problems resulting in dissolution of Sativa; (2) improvements at Sativa interim management and costs to the Administrator; (3) efforts to find a permanent home for Sativa; and (4) whether the change in management affects the reliability, quality, and affordability of water service.

[21] California Assembly Bill 1577 (Gipson) Urgency Bill enacted in September 2018

A. Water Supply Problems

The infrastructure and financial health at Sativa County Water District have declined over time. At its peak, the system owned four wells to serve the 1,643 connections in the District. Within the last decade, the District abandoned two wells, leaving only one fully producing well and one marginally producing well. When they abandoned the two wells, Sativa's only responsibility was to inform the State Water Board that they had abandoned the wells.

Sativa had no storage tanks to rely on if the remaining two wells went down for repair. After Sativa's abandonment of the two wells, the Los Angeles County Fire Department was concerned that the lower flow of water through the system would result in inadequate water pressure for firefighting.[22] The current website for the Sativa LA County Water District states, "Sativa has been cited by State regulators for not providing the adequate water pressure required for firefighting." However, no one, not the State nor the County Fire Department, was actually requiring Sativa to replace enough water to meet water pressure requirements.

Unless a water supplier requests a grant for a replacement well or requests an interconnection to another supplier or wholesaler, neither the State Water Board nor any other state or local agency has authority to require an immediate well replacement or alternative supply to address firefighting water pressure needs. State legislation[23] requires larger urban systems to submit Urban Water Management Plans, including analysis to show that they have an adequate water supply or plans to increase supply. However, small systems are exempt. Sativa never replaced the abandoned wells nor obtained replacement supplies by purchasing water.

B. Water Pollution Problems

In 2018, about a year after this firefighting water pressure citation, Sativa County Water District had other, much more publicized problems. The tap water delivered to customers was browner, filled with sediment, and had an odor. There was no violation of primary water quality standards, but the water contained manganese. As discussed in more detail in the next section, Sativa is only one of the water systems impacted by manganese, a natural pollutant in these groundwater basins that makes water look and smell polluted.

[22] Conversations with Alexander Coffman, Legislative Aide to, Assembly member Mike Gipson, 64th Assembly District, March 2017 focused on the water supply and fire protection problems caused by abandoning and not replacing the two wells

[23] *California Water* Code, §10610-10656 and §10608.

Figure 3. Residents Bring Bottles of Brown Tap Water to Community Meeting

Source: Los Angeles County Department of Public Works, Presentation at Sativa Water System Comunity Meeting, February 19, 2020

Figure 3 is a photograph taken in 2018, showing residents with bottles of brown water polluted with manganese. Given that the District's distribution system had poor circulation, with many dead-leg pipes, manganese built up in the pipes over a long time. Figure 4 is a photograph showing a large accumulation of manganese in the pipes. This buildup is the result of inadequate circulation and inadequate flushing to clean the pipes. This was the brown water coming out of residents' taps.

Figure 5 below shows the amount of sludge that Los Angeles County's contractors flushed out of one pipe after they took over Sativa. The concentrations of manganese appear to be far higher in the pipes than in the monitored well supply.

Figure 4. Accumulation of Manganese Buildup in Sativa Distribution System

Source: Los Angeles County Department of Public Works, Presentation at Sativa Water System Community Meeting, February 19, 2020

Figure 5. After Los Angeles County Takes Over Administration of Sativa: Flushing Accumulated Manganese Out of the Sativa Water Distribution System

Source: Los Angeles County Department of Public Works, Presentation at Sativa Water System Community Meeting, February 19, 2020

C. *Interim Management by Los Angeles County*

When Los Angeles County took over Sativa, they designated a Staff System Administrator to run Sativa and work with the community in the Sativa office. The County immediately found many more serious problems than known before they took over the District. These problems included a management system in disarray, lack of standard accounting and budget information, undocumented debt, and a number of lawsuits against the District for unpaid debts and for providing poor water to customers. They also found an antiquated liquid chlorination storage tank that was unsafe to store in a residential neighborhood. There were no back-up pumps to replace broken pumps. The distribution system was old and had many dead-ends. There was no interconnection to another water system for emergencies. Three part-time water system operators ran the system without the resources or supervision to keep the system functioning and in repair. The Interim Administrator had to assess and address all of these issues.

Los Angeles County had two significant unexpected problems as Administrator of Sativa. In September 2019, about one year after becoming Administrator, the County reported that it spent $8 million dollars.[24] Since the State had only agreed to would fund an Administrator for up to $200,000, this left the County to pick up most of the bill. Those unfunded costs are still mounting.

Their experience and liability exposure make the important position of Interim Administrator extremely unattractive for others who are well qualified to take over another water system in trouble. While all of the urgent repairs moved forward, the Administrator also needed to find a willing and capable water system to take over the District on a permanent basis.[25]

D. *Infrastructure Repairs and Improvement in 2019-2020*

In 2019, as they began to make improvements at Sativa, Los Angeles County accomplished the following improvements to the water system (Los Angeles County Presentation, February 19, 2020):

- They negotiated and built a new interconnection to an adjacent water system. With this interconnection, the County could purchase water for residents from the neighboring system while the system improvements to the well, distribution system, and the new water treatment plant are completed. With this interconnection, the emergency water supply and fire flow problems due to well closures have been temporarily resolved.
- The interconnection gave the County the opportunity to close down the two remaining wells

[24] Slide Presentation by Dan Lafferty and Russell Bryden, Los Angeles County Department of Public Works, September 13, 2019. "Sativa Water District: Lessons Learned as a State Administrator", at a Workshop on Water Resiliency and Safe and Affordable Drinking Water Strategies with Under-Served Regions of Los Angeles County, City of Lynwood City Hall Auditorium.

[25] The information about condition of the Sativa County Water District and water quality problems in this case study came from: (1) Interviews and a September tour of the Sativa Water system with Russ Bryden, Administrator for the District; (2) The Sativa LA County Water District website, https://www.sativawd.com/news.php, where several presentations by the County to residents are posted; (3) Los Angeles County reports to LAFCO and (4) an interview with Dan Lafferty, Deputy Director for Water and Los Angeles County Department of Public Works on July 29, 2020.

to provide time for intensive cleaning, renovation, and flushing to remove accumulated manganese and sediments from the distribution system, immediately improving water quality.

- In 2020, the County obtained a Proposition 1 grant for $1.77 million to fund the interconnection and other improvements below (Los Angeles County Report to Los Angeles County LAFCO, September 2019):
    - Pipeline Repair: $600,000 — replace a damaged, critical segment of Sativa pipeline under the Blue Line railroad tracks.
    - Well Rehabilitation: $350,000 — disassemble, clean, and repair the major components of Sativa's two wells.
    - Electrical/Mechanical Replacements at Well Sites: $175,000 — replace all electrical systems and mechanical equipment used to pump water from Sativa's two wells.
    - Chlorination System Conversion: $60,000 — replace or rebuild Sativa's chlorination system to be safer and more secure.
    - Supervisory Control and Data Acquisition (SCADA) System: $120,000 — Install technology at Sativa's wells to allow remote monitoring and remote control of operations.

E. Manganese Treatment Plant

The WRD was already assisting Sativa County Water District on an application for a Manganese Water Treatment System before LAFCO dissolved the District. WRD continued with grant applications for funding, engineering plans, and permit applications after Los Angeles County became the interim grant beneficiary. The County collaborated with the WRD to pursue other grant funds for the manganese treatment system. The WRD and the County have applied for $2.25 million in Proposition 1 funding through the State Department of Water Resources' Integrated Regional Water Management (IRWM) Program. The Department finalized grant approval in October 2020 (M. Kennedy, personal communication, 2020).

F. Understanding Sativa County Water District's Finances

Each year, special districts, including county water districts, self-report detailed financial information to the State of California Controller as public information. Sativa reported financial data to the State Controller every year.

In 2016-17, Sativa County Water District reported $1,158,692 in operating revenues and $1,150,576 in operating costs, with $8,116 in net operating revenues. The report to the Controller was published on October 23, 2018 (California State Controller's Office, 2018).

However, in 2019, Los Angeles County was the Administrator. When they took over Sativa, they found no financial records. They reconstructed the budget from receipts. Using this reconstruct-

ed budget for the 2017-2018 annual report, they reported $1,285,833 in operating revenue and $1,963,598 in operating costs, with a net loss of $677,765. The report was published in October 30, 2019 (California State Controller's Office, 2019). The financial situation changed dramatically in one year. However, the main thing that changed for Sativa between the two reporting periods was that the earlier report was prepared by Sativa County Water District in 2017 and the later report was prepared by Los Angeles County in late 2018.

G. Post Dissolution: The Los Angeles County Financial Assessment and Independent Audit

The County did its own audit of expenses, revenues, assets, and liabilities and then hired an outside auditor to perform an independent audit for Fiscal Year 2018-2019 (The Pun Group, September 2019). Despite the problems in doing a financial audit when they had to use receipts and records to create a report, the Auditor was able to complete a report. The formal audit pointed out several problems with financial management:

- Using a flat fee for water rather a charge on consumption, meant that the District did not receive enough revenue to cover the direct costs of providing water.
- 36 out of the 90 transactions reviewed, or 40%, were cash disbursements without any supporting documents. This represented $385,000 in expenditures, raising concerns about the District's record keeping.
- The Auditor could not identify another 200 cash disbursements totaling $84,223. There were also three credit cards issued to employees or representatives with about $93,000 in unsubstantiated charges. All of these expenditures could involve improper or illegal actions.
- In June 2017, Sativa County Water District had received a bank loan of $1.62 million dollars. This loan was for the sorely needed well construction. However, Sativa didn't expend the loan funds on the well up until the time that Sativa was dissolved. Instead, it appeared that the loan was spent on day-to-day expenses.
- The Auditor concluded that, before the County took over, the Sativa County Water District Board of Directors and management was funding its operations in a financially unsustainable manner, even if there was no wrongdoing.

The flat rates, poor record keeping, abnormalities in undocumented spending, and the loan not used for the purposes stated, all point to serious financial management problems that did not allow the District to properly maintain its system and ensure clean and reliable water supply. The Los Angeles County Department of Public Works turned the audit over to the Department of Auditor-Controller's Office of County Investigation to determine whether any violations of law had occurred and for possible referral to the District Attorney (Lafferty, 2020).

H. Regular Public Meetings with Sativa Residents

The County undertook a significant community outreach and communication program to keep the community informed about each improvement undertaken and to address community distrust stemming from years of poor water service. In addition, the County made significant efforts to make sure that the residents knew where to report any cases of brown water. Achieving clear running drinking water was extremely important in gaining community confidence. There was considerable community discussion about the change in water quality achieved through the interconnection and system flushing to remove manganese. There was also discussion about the future management of Sativa once the County selected a water system to take over the Sativa system. Fear of rate increases was the major concern residents expressed about a new system owner (Lafferty, 2020). There have been no public meetings noticed on the system website since February 2020.

I. Consolidation of Sativa County Water District with Another Water System

As Administrator of Sativa, Los Angeles County is responsible for finding another water system that would be willing and able to take over the water system. The County put out a request for proposal and received five bids. Four of the bids were from IOUs and one bid was from the Central Basin Municipal Water District. However, they don't have local water system expertise because they are not a water retailer. The Los Angeles County LAFCO tried hard to find a publicly owned water system willing to take over Sativa. However, none of the contiguous public water systems bid. An adjacent city looked at the state of the Sativa water system and its finances. They determined that they would have to raise the rates of its own customer base to bring Sativa up to required operating standards.[26]

The County Bid Review Committee assigned to review the five bidder proposals recommended that the County Board of Supervisors accept the bid from Suburban Water Systems (Suburban), a Class A Public Utility.[27] At the time of writing this report, the County is negotiating an Exclusive Negotiations Agreement with Suburban Water Systems. This agreement will cover all aspects of the acquisition of Sativa by Suburban. The County anticipates that Suburban will be the contract operator of the Sativa System during the CPUC proceedings. There is a deadline for the parties to reach agreement, but negotiations can be extended past the deadlines if progress continues to be made (Lafferty, 2020).

Suburban has substantial groundwater pumping rights already and serves all of their current customers with groundwater. Their ability to rely on 100% groundwater is one of the reasons for their low water rate at $61.39 in 2020 (C. Gott, personal communication, 2019). Suburban is one of two IOUs in the WRD with a water rate that is lower than the WRD average rate. In fact, Suburban's rate is significantly lower than the current Sativa rate, but it is variable, while Sativa's rate is flat.[28]

[26] Presentation by Paul Novak, Los Angeles County Local Agency Formation Commission Executive Director, March 2020.
[27] http://www.swwc.com/suburban/
[28] Variable rates matter more for high water users, who tend to be high-income, while low-income users minimize water use (Mini, 2014).

Therefore, Sativa ratepayers who conserve water theoretically could have an initial cost savings. However, if Suburban needs a more substantial system-wide rate increase in its quest to purchase and improve the Sativa water system, rates for Sativa may also rise.

Sativa still needs significant capital investment as well as improved technical expertise for maintaining the water system and professional fiscal management. The proposed treatment system needs qualified water treatment system operators with a budget for operations and maintenance. Furthermore, Los Angeles County, or the new owners, will need to complete an additional estimated $17 million in improvements that the State Water Board has ordered, over and above those already completed or currently planned (Lafferty, 2020). The $8 million that Los Angeles County has infused into the District is the down payment on these other improvements.

J. Los Angeles County Financial Deficit at Sativa

It is not yet clear if and how the $8 million+ in funds expended by Los Angeles County at Sativa from 2018 to the first part of 2020, will be reimbursed. On December 24, 2018, the Board of Supervisors sent a letter to many legislators (Los Angeles County Board of Supervisors, December 24, 2019) requesting reimbursement for $1.4 million of the direct administrative costs over and above the $200,000 originally in the State Budget for reimbursement in the 2018-2019 Budget. These monies were for administrative costs incurred related to the expenses described below:

> "1) urgent repairs to Sativa's water system infrastructure; 2) addressing safety issues; 3) professional oversight of Sativa's field personnel; 4) addressing Sativa's past due, current, and upcoming bills; 5) reconstructing Sativa's accounting records; 6) developing proper accounting control procedures; 7) professional oversight of Sativa's procurement and accounting activities; 8) a thorough financial audit; 9) information technology support; and 10) legal services"[29]

The State Budget for 2019-20 did not reimburse Los Angeles County for any of these costs. By the end of July 2020, the County has not tried to obtain reimbursement from Suburban as a part of negotiating the Exclusive Negotiation Agreement or from the ratepayers at Sativa (Lafferty, 2020). However, those losses are the reason why County representatives have said publicly that they would not become an Administrator again.

Once the Sativa sale agreement with Los Angeles County is complete, Suburban must submit the acquisition proposal to the CPUC for approval.

Los Angeles County selected the best possible bidder for the system based on system capacity and water rates. If Suburban Water Company can make the necessary improvements over time and maintain or modestly increase current water rates, then the sale of Sativa to Suburban should have

However, some Sativa customers might not have that habit since they have no price signal that would lead them to conserve.

[29] Letter from the Los Angeles County Board of Supervisors to various state legislators, December 24, 2018.

a positive outcome for Sativa customers.

K. Lessons from the Sativa Case Study

The case of Sativa County Water District is important for several reasons. First, it demonstrates that the problems that can put a system at risk are different in urban and rural systems. Even small urban water systems have a much more extensive water distribution system than smaller rural systems. Sativa demonstrates that pollutants at the water source can accumulate in much higher concentrations in a poorly maintained distribution pipe system. In addition, a large proportion of disadvantaged residents are renters. Unless the renters pay water bills directly, they may not

know what water system serves them. In Mutual Water Systems and IOUs, renters cannot vote for Board members. In rural water systems, the systems are smaller, and residents are more likely to know who provides drinking water.

Second, it took more than 15 years of deteriorating water service and infrastructure in the Sativa water system for action to dissolve the Sativa County Water District. There were signs well before 2018 indicating that Sativa had insufficient water supply, insufficient system maintenance, financial troubles, untreated manganese pollution, and no water storage. Some of these problems were included a 2005 LAFCO review (Jennings & Vives, 2019a).

Third, LAFCOs do not dissolve government agencies easily. There is great deference to elected boards, and Sativa's Board members and manager strongly resisted any interference. However, if LAFCO wanted to dissolve and consolidate Sativa, they could not consolidate it, except with another public water agency and there were no interested public water systems. Board members were also concerned that consolidation would result in water rates beyond the capacity of residents (Jennings & Vives, 2019a).

Fourth, Sativa's low, flat water rates kept most residents content with the current Board of Directors until the water quality problems were impossible to ignore. However, the low, flat water rates that were important to residents were also part of the problem. There was not enough revenue to maintain the water system or operate it properly (Lafferty, 2020). Finally, community ratepayers and elected officials incensed about the brown water forced action by the Legislature (M. Kennedy, personal communication, 2020). The Legislature responded quickly to pass urgency legislation to allow a solution for Sativa.[30] If legislation had not passed in 2018 authorizing the State Water Board to appoint an Interim Administrator to oversee the transition of Sativa to a new owner, no progress would have been made. Without an Administrator, there would have been no responsible entity to appoint an interim administrator or oversee a consolidation. A public crisis brought a solution.

Los Angeles County's willingness to be the first Interim Administrator is the reason much progress has been made. The County was willing to bring a high level of staff expertise from across county

[30] Id at Note 50.

government and from expert contractors to address the problems discovered. They moved forward quickly, despite unexpected legal and financial liability. However, the County concluded that they cannot accept this role again for another failed water system. In this report, we make some recommendations to make it possible to find expert Interim Administrators for water systems in Los Angeles County and elsewhere in the state.

VI DISADVANTAGED COMMUNITY WATER SYSTEMS IN SOUTHERN LOS ANGELES COUNTY

The Sativa Case Study provides a road map for assessing the risks of other urban DAC/SDAC community water systems in Southern Los Angeles County. The Legislature recognized that the Sativa County Water District failure could happen again. The 2019-2020 state budget (SB 73, Budget Act of 2019) earmarked funding for an in-depth assessment of the cluster of DAC/SDAC systems in Southern Los Angeles County. The WRD will receive these funds to evaluate the DAC/SDAC systems that nest inside its boundary. WRD will work directly with the DAC/SDAC systems in its jurisdiction to evaluate risks based on information that the water systems share about their infrastructure, water quality, operational capacity, and financial status. Water system participation will be voluntary.

A. The Boundary of Southern Los Angeles County

Several general boundaries could demark Southern Los Angeles County. In this report, the WRD boundary on Figure 3 is the boundary for Southern Los Angeles County. The combined Central and West Coast Groundwater Basins are the WRD Boundary. All community retail water systems in the subregion nest within one of the groundwater basins and within the WRD. The cluster of Southern Los Angeles County DAC/SDAC systems shown in Figure 3 are within the WRD boundary. The Legislature created the WRD to augment these basins with other water sources and to protect drinking water quality for all systems that draw from them.[31] The WRD already has a safe water program focused on DAC/SDAC systems, detailed later in this section.

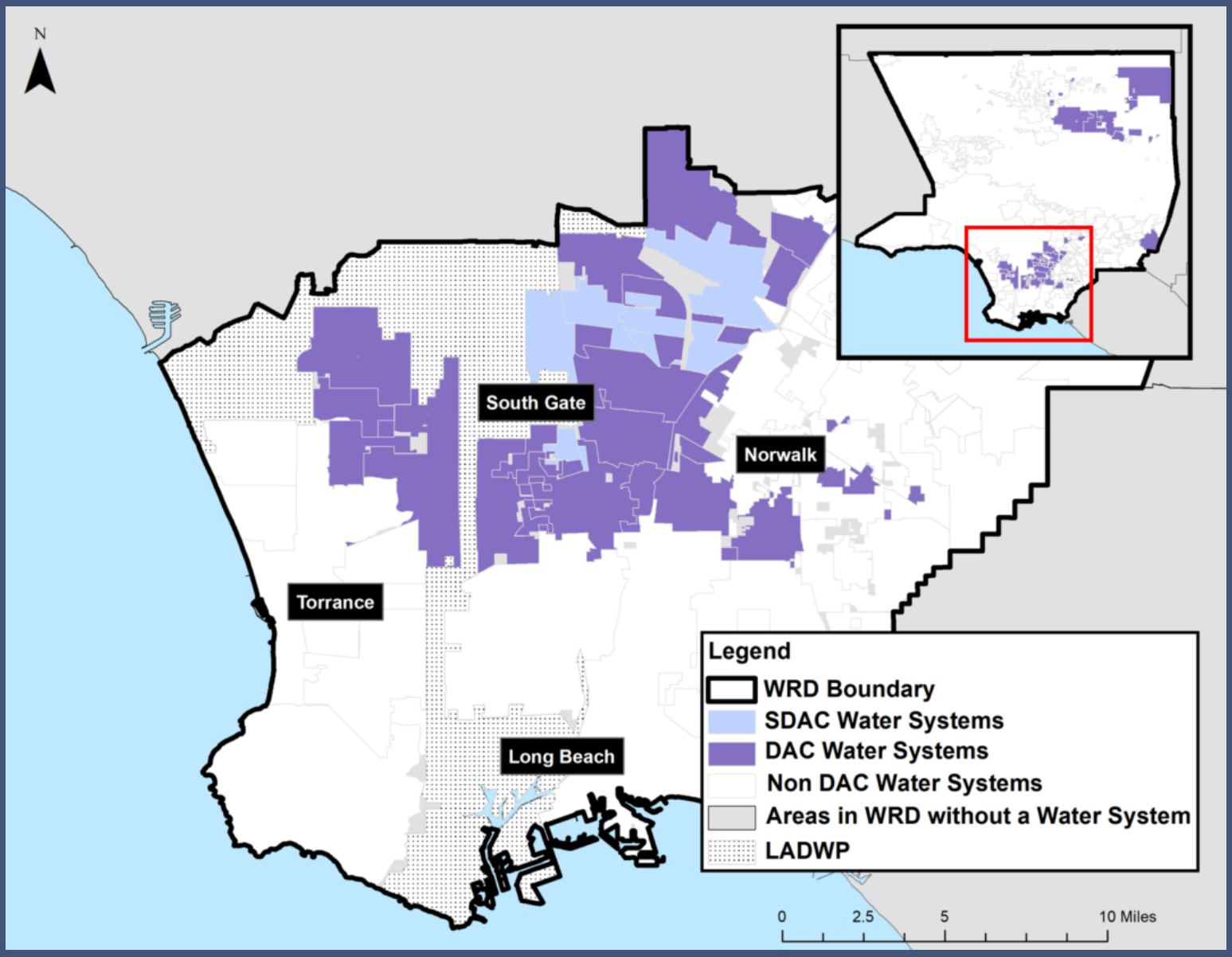
B. Distribution of DAC/SDAC Water Systems in Southern Los Angeles County

Using the analysis done by Reibel et al., there are 57 separate community water system service areas[32] in the WRD boundary. Figure 3 shows that over half of them are DAC/SDAC water systems, reflecting a longstanding concentration of poverty in part of the WRD. This section will describe all of the water systems in the WRD boundary, the issues that may particularly affect DAC/SDAC systems, and the capacity of surrounding systems to absorb those water systems that are failing or not viable. Figure 3 divides the water systems into three categories: Non-DAC, DAC, and SDAC. Of the 29 disadvantaged water systems in the WRD, 19 are DAC and 10 are SDAC. This section of the report demonstrates why knowing the location, the type and distribution of DAC/SDAC systems, and the percent of all systems

[31] The WRD was created by a vote of the citizens of Los Angeles County and pursuant to the Water Replenishment District Act enacted in 1955, codified at section 60000 et seq. (Stats. 1955, Ch. 1514, § 1, p. 2755; Water Replenishment Act). The purpose was to have an entity to replenish the two groundwater basins with "new water" (from imported sources), as extraction rates agreed to in the adjudication of each basin are only sustainable with replenishment. In recent years, the WRD has moved from dependence on imported water for replenishment to development of local recycled water at a large scale stored in the groundwater basins. Water rights holders pay replenishment fees to support the WRD in this function. In addition, the recent amendments of the Central and West Basin Adjudications created a Watermaster for each basin. The WRD was designated in the final court adjudication of the Basins as the staff to the Watermaster in each basin. The Watermaster is a Board of Directors for each basin made up of water rights holders (Porse et al., 2015).

[32] These 57 separate water system service areas include several noncontiguous served by different IOUs. A small portion of LADWP is also within the WRD.

Figure 6. Disadvantaged Water Systems in Southern Los Angeles County



Source Data: Reibel et al., 2020

that are DAC/SDAC are important for water system risk assessment and in looking for solutions for systems at risk.

The majority of DAC and SDAC systems are in two clusters. One cluster is separated from the other by the narrow "Shoestring Strip" of Los Angeles. The "Shoestring" is served by LADWP. The City of Los Angeles annexed this strip in 1906 to connect the inland city boundaries to what is now the Port of Los Angeles (Guinn, 1914). This strip is not shown as a DAC because it is a small part of the much larger City of Los Angeles and the LADWP that has a higher median household income overall. However, if this narrow, long "Shoestring Strip" were a separate water system, it would likely be a DAC or SDAC system.

Unlike rural DAC and SDAC systems that are typically scattered, Figure 3 shows these DAC/SDACs are tightly concentrated together in poor communities of color, and many are quite small by urban standards. In a distribution like this, one must question whether consolidation works as a solution. Would a DAC/SDAC system be willing and capable of annexing adjacent DAC/SDAC water systems at risk? The LADWP, which is 58th water system in the WRD, is on Figure 6. This analysis excludes LADWP two reasons. First, LADWP is much bigger than the portion in the WRD. It is not, as a whole, at DAC/SDAC median family income levels. Second, at this time, this report excludes LADWP as a potential consolidator of DAC/SDAC systems. Despite being adjacent to many DAC/SDACs and a viable alternative, it is not clear that the City of Los Angeles Charter allows the City to annex a water system without annexing the territory of that water system to the City. Since many DAC/SDAC systems are already in cities, the issue needs further legal analysis.

Clustering of DAC/SDAC systems does not mean that there are no options for consolidation. However, most public and non-profit water systems would only acquire a failing system that is directly adjacent to their current boundaries. Adjacent public water systems for physical consolidation are limited in WRD to other DAC/SDAC water systems or a new larger water system that encompasses all the DAC/SDACs. However, IOUs operate separate service areas and could consolidate a DAC/SDAC water system physically separate from their existing service areas.

C. Who are the Stakeholders in Southern Los Angeles County Drinking Water?

The State of California has a commitment to improving the human right to water for communities in water systems that are not performing. Both the executive and legislative branches of state government and many water policy experts think that many small systems created long ago should be consolidated in urban areas for economies of scale and better capacity to meet the requirements of water service in the 21st century. This idea is included in many recent statutes and regulations that provide impetus towards physical (acquisition or merger with another system) or managerial consolidation (California Water Resources Control Board, 2020).[33] Local stakeholders, strongly attached

[33] The State Water Board) supports water partnerships whenever feasible. Water partnerships can take many forms, including local resource sharing, physical consolidation, managerial consolidation, and full regionalization. https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/partnershiptools.html

to home rule, may or may not agree with this. The purpose of this section is to express their views.

These stakeholders include:

- Managers and governing boards of small water systems.
- Associations that represent different types of water systems.
- Customers of small water systems.
- Community-based organizations that promote environmental justice for disadvantaged communities.
- Environmental organizations that are advocates for clean drinking water.
- Adjudicated Groundwater Basin Pumping Rights Holders and those who want to purchase or lease groundwater pumping rights.
- Groundwater management agencies, including those that replenish the groundwater basins and initiate cleanups where necessary.
- Groundwater Basin Watermasters who govern the withdrawal of water from each groundwater basins by those who have adjudication rights to extract water supply.
- Cities and counties who represent the communities served by DAC/SDAC water systems. and
- County Local Agency Formation Review Commission charged with oversight of publicly owned water systems.

From December 2017 to September 2019, The UCLA Water Resources Group, at the UCLA Institute of the Environment and Sustainability, convened three meetings with stakeholders in Los Angeles County. The first meeting was co-hosted by the UCLA Water Resources Group and California Association of Mutual Water Companies. It included a Los Angeles County-based group of stakeholders including some water systems managers from three groundwater basins, the Watermasters for three basins, the California Association of Mutual Water Companies, the Public Water Agency Group representing County Water Districts, one IOU, and community-based environmental justice groups. The purpose of the meetings was to create a dialogue among the parties about the problems of small disadvantaged water systems and to hear the perspectives of stakeholders on the water quality and reliability of small water systems in the County as a whole, particularly in the Southern Los Angeles subregion represented by the WRD boundary. The second meeting was co-hosted by the WRD and the third by the Los Angeles office of Physicians for Social Responsibility, the State Water Board, and The Water Foundation.

1. The Small Water System Manager Perspective

Small water systems have organized many times in the past to oppose legislation or efforts to

consolidate any systems in Los Angeles County. They feared that any consolidation, however merited for a particular small system, would lead to State-led consolidation of all small water systems, regardless of their capacity. During the course of these meetings, the water system managers expressed concern that regulators presumed that small size equated to limited capacity. These water system managers readily agreed that there were some poorly run small systems that might need consolidation.

Managers did not think it was correct to conclude, by definition, that small systems cannot run their systems efficiently. There were areas where these system managers did feel disadvantaged by their small size. They thought that one solution could be that small systems would pool their financial resources to pay a larger entity to provide services they cannot afford to pay for or provide on their own. They also agreed that a process to "stress test" systems for risk had merit. Stress testing those water systems would focus consolidation attention on those that are failing and need consolidation. On the other hand, those that are not failing, but need help could get technical support, local pooled services, and grants before consolidation is considered.

They suggested that pooling funds for some services and obtaining technical assistance from the State Water Board for DAC/SDAC systems could be another solution for DAC/SDAC systems with the capacity to take advantage of this. That concept is in some ways similar to the State Water Board "managerial consolidation" alternate to full consolidation.

The second meeting hosted by UCLA Water Resources Group and the California Association of Mutual Water Companies focused on the ongoing UCLA/California State Polytechnic at Pomona study showing the distribution of 64 different DAC/SDAC systems in Los Angeles County. The discussion centered on those in the WRD boundary. The meeting included the same stakeholders and some additional community-based environmental justice organizations. The Water Replenishment District presented their disadvantaged water system programs. There was further discussion about the merit of mapping DAC/SDAC water systems statewide, as well as a discussion about how to "stress test" disadvantaged water systems and pool resources for small systems.

2. The Community-Based Environmental Justice Perspective

The UCLA Water Resources Group co-organized the third meeting for a group of community-based organizations working on environmental justice issues for Southern Los Angeles County communities.

Historically, the community-based organizations in Los Angeles County have been leaders for environmental justice on many problems including:

- Air pollution and toxic effects on disadvantaged communities.

- Brownfields from water and soil pollution.
- Groundwater contamination that exposes communities to soil vapor gases.
- Unequal access to public resources (e.g. parks) and services.
- Climate change disproportional effects on disadvantaged communities.
- More recently, multi-benefit stormwater capture projects that reduce pollution.
- Increase water supply, provide local jobs, and enhance DAC communities.

Currently, no single community-based group in Los Angeles County has a significant proportion of their resources devoted to drinking water. This is probably because community-based organizations for disadvantaged communities have long-standing commitments to a host of problems started decades ago without considering drinking water.

Residents perceive problems when they see or smell dirty water, or have no water coming out of their taps. They also perceive problems when they cannot pay their bills and water service shuts off. If a community-based organization tries to help disadvantaged community members to seek redress of water system problems, that organization needs to invest a great deal of time at the beginning. It means learning about water suppliers, water costs, water rates, infrastructure needs, and water quality standards, as well as understanding a large new set of drinking water laws, source water issues, funding sources, governing authorities, and regulators. The fact that there are 200-plus water systems in one county also makes it difficult to know who serves any neighborhood or larger communities. Community-based organizations also need to understand a new set legal and governance institutions to address drinking water problems affecting their communities. Some groups at the meeting already see differing regulatory silos for the issues they already address as a fundamental problem.

As a result, community-based organizations need to make a big initial investment in expertise to advocate for clean, reliable, and affordable drinking water. Unless they receive major new funds, water is a competitor for their time and resources with well-established organizational commitments. Smaller foundation commitments to do specific tasks can actually increase their workload without the additional resources to become experts and without additional staffing experts on drinking water to help them.

Some at the meeting suggested a different approach to regulation — combining all sources of pollution and essential services like drinking water into one regulatory system. This would help community-based groups represent disadvantaged communities more effectively. Navigating a unified regulatory system would make it possible for communities to address the multitude of problems in low-income communities of color more effectively. Many other California stakeholders have asked for the same regulatory approach for decades.

D. The Water Replenishment District of Southern California Safe Drinking Water Program[34]

While Los Angeles County drinking water system monitoring shows few primary MCL violations relative to other counties (Pierce & Gmoser-Daskalakis, 2020), groundwater pollution problems merit continued focus. The WRD is very focused on removing or treating a wide range of pollutants in groundwater. They also have a Safe Drinking Water Program to collaborate with water and well system owners addressing groundwater water quality problems particular to this area in three different initiatives (Water Replenishment District of Southern California, May 12, 2020):

- The first initiative focuses on the removal of Volatile Organic Compounds (VOCs), a group of 27 organic pollutants with federal and state primary pollutant status. "The quality of groundwater in parts of the upper aquifers of both Central and West Coast basins is also impacted by both organic and inorganic pollutants from a variety of sources, such as leaking tanks, leaking sewer lines, and illegal discharges. *As the aquifers and confining layers in these alluvial basins are typically inter-fingered, the quality of groundwater in the deeper production aquifers is threatened by migration of pollutants from the upper aquifers*"(emphasis added) (Los Angeles County Regional Water Board, 2014).

- WRD offers financial assistance for design, equipment, and installation for a treatment facility for a well impacted by VOCs.[35] However, the annual report produced by the State Water Board shows no exceedances of the primary pollutant MCL for VOCs in Los Angeles County. Water Systems would not be constructing treatment systems if there were no exceedances. Further work should clarify whether VOC pollutants threaten Southern Los Angeles County water systems and why those exceedances are not reported in public data.

- The second initiative offers zero-interest loans for secondary pollutants that affect a specific production well. The capital costs of wellhead treatment facilities range from $800,000 to over $2 million. Due to financial constraints, the initial cost is generally prohibitive to smaller pumpers. Financial assistance through the District's Safe Drinking Water Program (SDWP) makes project implementation more feasible.

- The third initiative is the Disadvantaged Community Water System Program. The WRD offers to obtain grants for capital projects from the State Water Board and other sources that allocate specific grants for qualified DAC/SDAC water systems. They assist in income surveys to qualify water systems for grants.

[34] Safe Drinking Water Program, https://www.wrd.org/content/other-projects-and-programs.

[35] VOCs are in many household, commercial, industrial, and agricultural products and are characterized by their tendency to volatilize (evaporate) into the air. Solvents are VOCs and are used for a number of purposes, including manufacturing and cleaning. In the Coastal Los Angeles Basin study unit, solvents were present at high concentrations in about 4% of the primary aquifer system, and at moderate concentrations in 11%. The solvents detected at high concentrations were tetrachloroethene (PCE), trichloroethene (TCE), 1, 1-dichloroethene, 1,2-dichloroethane, and carbon tetrachloride (U.S. Geological Survey & the California State Water Resources Control Board, n.d. post-2012).

- Currently, twelve DAC/SDAC water systems in the WRD are taking advantage of this program. DAC/SDAC water systems come to the WRD to get assistance in applying for and obtaining grants for capital improvements related to water quality from the State Water Board or other water infrastructure from other funding sources. While the needs vary, there are water user complaints about water quality in many water systems. Other systems need new wells or interconnections for emergency services. The WRD provides engineering expertise to evaluate problems and work with them on solutions. The WRD also has Kennedy Communications as their Disadvantaged Water System Community Consultant who works with each water system's board members and staff on grant proposals and concept plans. Water Systems must share information with the WRD to include in grant proposals.

When WRD has all of the necessary information, they submit a grant application on behalf of the water system. Their first step is obtaining a project-planning grant. Once that is completed, WRD will apply for a grant to do detailed plans, obtain permits, and construct new infrastructure. WRD takes responsibility for hiring contractors and supervising construction. When construction is completed, WRD will supervise system commissioning and get final drinking water permits from the State Water Board. When the project is complete, the local water system takes over operations, maintenance, and management. When needed, the WRD encourages systems to increase their water rates and improve financial management (M. Kennedy, personal communication, 2020) to ensure that the water system can cover all of the associated operating and maintenance expenses. Over the course of the entire process, Kennedy and project engineers will meet with the water system staff and board to help them prepare to operate the improvements and manage them.

This program has been in effect for several years. The WRD aims to help existing DAC/SDAC water systems improve their capacity to manage their systems. One treatment project has been completed and another is close to completion. The water systems are ready to take them over. Other systems are in different preconstruction phases. Only time will tell whether water systems can afford the costs of operations and maintenance and can manage their systems over the long run (M. Kennedy, personal communication, 2020).

E. Manganese Pollution in the Central and West Coast Groundwater Basins

A 2012 USGS report characterized manganese and iron pollution in these basins. "Iron and manganese are secondary pollutants that are naturally present at high concentrations in about 19% of the primary aquifer systems and at moderate concentrations in about 15% of the LAWPs[36]" (U.S. Geological Survey & the California State Water Resources Control Board, n.d. after-2012). These secondary pollutants are a significant problem in drinking water wells in both groundwater basins. Secondary pollutants have aesthetic problems. Manganese in particular is a natural mineral in groundwater that makes drinking water look brown or red. It stains taps and sinks and has odor.

[36] Undefined in the text but the contextual reference is to the Central and West Coast Groundwater Basins.

In addition, there are health effects. EPA issued an advisory standard that states: "adverse human health effects from manganese in drinking water are *not* expected to occur *below* the advisory notification level of 50 parts per billion" (emphasis added) (California State Water Resources Control Board Division of Drinking Water, n.d.). The EPA set this advisory because there is evidence of health effects above that level.

The State Water Board requires testing for manganese at the water source every three years for systems (California Water Code, Title 22 California Code of Regulations) where testing shows that it exists. State Board databases[37] show many systems in Los Angeles County with manganese in their source water. A cursory review of the ten-year database revealed several water systems in the WRD where there have been very high exceedances of the advisory notification level recorded at wells between 2010 and 2020 (California State Water Resources Control Board. n.d.-b). The State Water Board requires water systems to report these exceedances to the local government as well as the customer.

Some of the exceedances were multiples of the advisory standard, raising potential health concerns. Since the water quality standard is advisory, there is no requirement for treatment. The five systems identified are all at or above statewide median household income. All built treatment systems for manganese (J. O'Keefe, personal communication, October 19, 2020). The DAC/SDAC systems have not been able to afford treatment systems until the State Water Board decided to fund manganese treatment systems for disadvantaged community systems.

There was a great deal of community concern in Southern Los Angeles about the manganese in drinking water in the three DAC/SDAC Maywood Mutual Water Companies (Wilson, 2009). However, before drinking water regulation and funding moved to the State Water Board, the California Department of Public Health Drinking Water Program staff was not interested in funding manganese treatment because of the low priority of secondary pollutants. After the move to the State Water Board, the WRD decided to become involved. They retained Maria Elena Kennedy (Kennedy Communications). Kennedy was able to submit the first grant applications for these systems on behalf of the WRD. She worked closely with the State Water Board staff in the Drinking Water Division and Division of Financial Assistance and demonstrated that WRD could complete projects on behalf of the DAC water systems successfully. By 2015, the State Water Board staff felt confident that Kennedy and the WRD could solve this problem —they could permit, construct and help the small water systems get ready to operate the systems.

Kennedy's success with WRD at the Maywood Mutual Water Companies "changed the way that the State Water Board staff viewed manganese and iron in drinking water, from a low importance problem to an important environmental justice problem that could be solved with State Water Board funding" (F. Spivy-Weber, personal communication, September 2, 2020).

[37] The authors have obtained the State Water Board Database with ten years of testing for manganese for Los Angeles County water systems. However, it is not clear whether secondary pollutant data is available on the website, as that is primary pollutant data.

F. *Different Types of Water Systems in Southern Los Angeles County*

Earlier in this article, we described the types of governance of retail water systems in California and showed the distribution of water system types across Los Angeles County. Table 1 combines these types into four major categories of systems within the WRD boundary. Figure 7 highlights the distribution of different types of water systems within the WDR boundary. Twenty-five cities manage water systems for all or part of their jurisdictions, while five IOUs operate twenty-one different service areas in the WRD boundary. There are eight mutual water companies and four special districts, including Sativa County Water District, now dissolved.

Most retail water connections in this area are either in city-owned or IOU systems. Mutual water companies and county water districts serve small communities. Only 12 of the 57 systems (19%) in the WRD are either mutual water companies or county water districts.

Table 1.

Types of Water Systems in the WRD Boundaries

Type	Number	Percent	Average Number of Connections	Total Connections
Investor-Owned Utility (IOU) Service Areas[38]	21	37%	20,729	353,644
Mutual Water Companies	8	14%	2,174	17,391
City Systems	25	44%	40,252	1,006,304
Special District	4	5%	2,878	15,718
Total	57	100%	N.A.	1,393,057

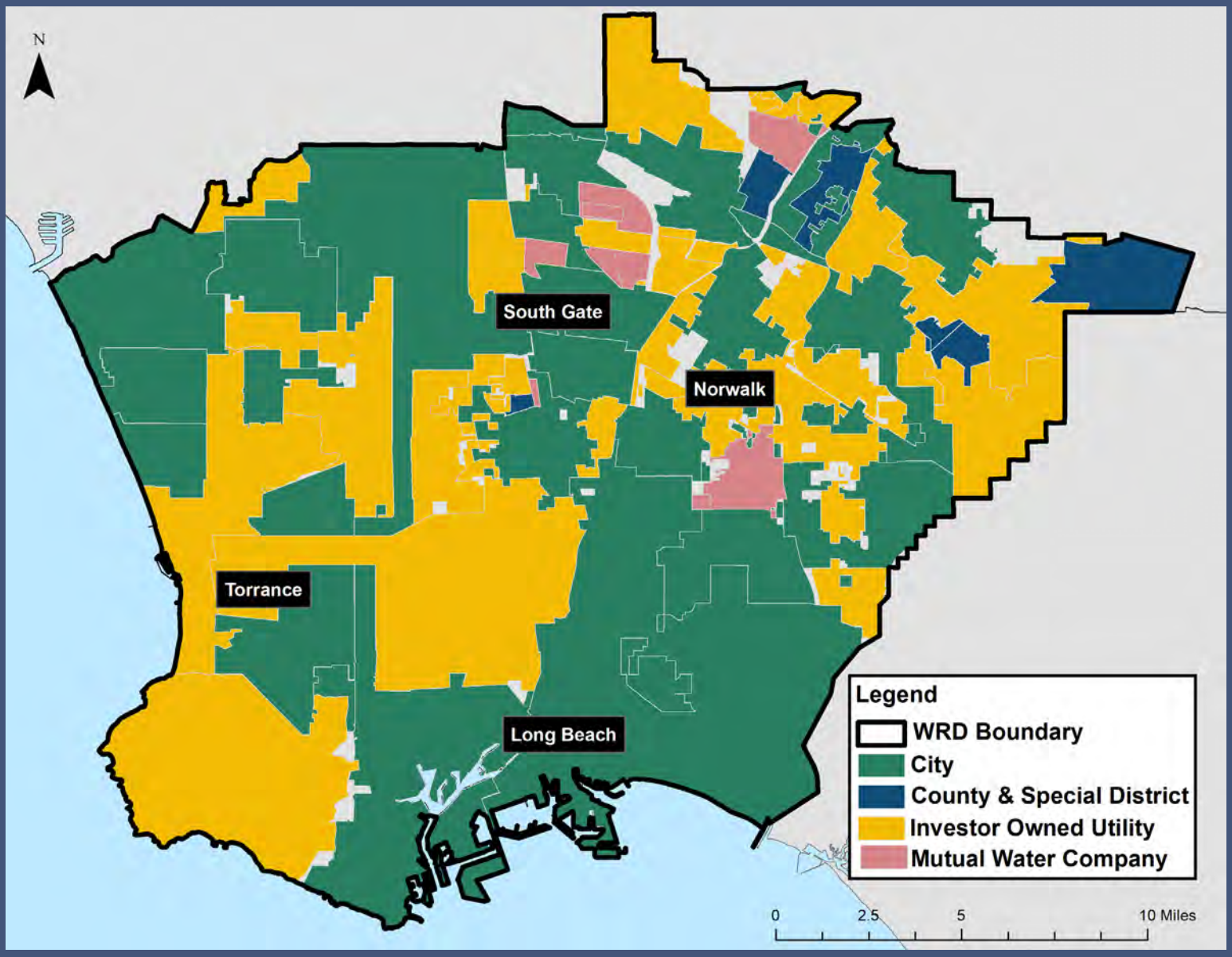
G. *Water Supply Source and Costs: Local Groundwater Versus Imported Water*

There are two general sources of water for retailers in Southern Los Angeles County. Water systems can buy imported water from their Metropolitan Water District Member Agency. MWDSC delivers water via the regional distribution system to the wholesalers and Central Basin and West Coast Basin MWDs. These wholesalers then deliver water to the retail water system. Alternatively, water systems can pump groundwater from the groundwater basin consistent with their adjudicated groundwater pumping rights and the annual allotments made by the Watermaster. The WRD replenishes the groundwater basins with recycled water and purchases some Metropolitan Water District imported water to augment natural stormwater in the groundwater basins. Retailers pay a replenishment fee to the WRD to pay for replenishment.

In the mid-20th century, adjudication of the Central and West Groundwater Basins allocated groundwater pumping rights and the amount of water that each can pump among water users at the time

[38] Five different IOUs own the 21 WRD IOU service areas.

Figure 7. Types of Water Systems in the WRD



Source Data: Reibel et al., 2020

of adjudication (Bloomquist, 1992). However, adjudication litigation on who manages basins as Watermaster was not resolved until 2014 (Porse et al., 2015). The final adjudication designated the WRD as staff to the Watermasters. The governing board includes rotating representatives of adjudicated pumping rights holders in each groundwater basin. All adjudicated pumping rights holders pay an assessment to the WRD to pump their adjudicated share of the groundwater. The fee covers costs to support the Watermaster administration of the groundwater adjudication pumping rights in each basin.

However, while the WRD puts clean water into the ground and the deeper groundwater basins are cleaner than the shallow basins, as stated above there are a variety of pollutants existing in both groundwater basins, both naturally and from industry, retail, roads, and other land uses. The rates that retailers pay the WRD for replenishment do not include their own cost of pumping the water out of the ground and any wellhead treatment costs to address contaminants.

Purchasers of MWDSC imported water can pay their wholesaler, either Central or West Coast Basins MWDs, different prices for treated or untreated water. In the latter case, treatment of imported water is the responsibility of the individual water system.

As shown in Table 2, the WRD Replenishment Assessment for groundwater was $268/AF in 2014/15 and was $365/AF in 2019-2020. While the rates have increased at about 10% per year over the last five years, groundwater rates still compare very favorably to the imported water rates. The Central Basin MWD water rates were over $1,200/AF and West Coast Basin MWD were at $1,405/AF.[39] Imported water rates have increased in part due to these problems:

- Drought and supply uncertainty.
- Increasing pollution in the delivered surface supplies requiring treatment.
- The rising cost of the imported water infrastructure improvements and operations and maintenance.
- The rising energy costs to move water.
- The cost of major planned investments in imported water projects in the State Water Project system, paid pro rata by the MWDSC and member agencies.

With the price differential shown in Table 2, water systems have a strong impetus to use their groundwater rights and either purchase or lease more groundwater rights, even when costs of water rights are high, and they must pay to treat the raw water. While the Annual Watermaster Report lists each sale and lease of groundwater rights, it does not list the sale price. The authors can only surmise that the value of water rights has risen with the cost of imported water, but the authors do not know the current market value. It appears, looking at water rate data along with the percent of

[39] Table 2 includes both treated and untreated water rates. It also excludes some wholesaler fees not clearly quantified in the rate setting documents of the Central and West Coast Basin.

the water source from groundwater, those systems that have purchased pumping rights recently or that do not have them at all, have much higher water rates.

For example, consider the case of Liberty Utilities that purchased the service area of the Park Water Company in Lynwood and Compton in January 2016. Park Water Company sold the service area but retained ownership of the groundwater rights. Liberty Utilities leases those water rights from Park Water Company at an agreed upon rate and still purchases some additional imported water. As a result, Liberty Utilities had the highest water rates in the WRD service area in 2019 at $102.88 per 12 Centum Cubic Feet (CCF). This rate went down to $91.88 per 12 CCF in 2020, with the expiration of some renewable surcharges.

Table 2.

Per Acre Foot Cost for Imported and Groundwater Sources

Water Replenishment District Groundwater Replenishment Assessment[40]		Imported Water Delivered to the Retailer by:	
Fiscal Year	Dollars per Acre Foot	West Coast Basin Municipal Water District	
FY 2019-2020	$365/AF	FY 2019-2020	$1,405/AF[41]
FY 2014-2015	$268/AF	FY 2014-2015	$1,336/AF
		Central Basin Municipal Water District	
		FY 2019-2020	$921/AF untreated[42] $1,240/AF treated

WRD Data: Ted Johnson, Assistant General Manager, WRD; West Coast and Central Basin MWDs from their websites.

H. Source of Water Supply for Different Types of Water Systems

Table 3 shows proportional use of groundwater and imported and/or recycled water for each type of system. Water retailers in the WRD obtain an average of 65% of their water supply from groundwater. The only subregion of Los Angeles where the percent of the supply coming from groundwater is equal or greater is the San Gabriel Valley, supplied by the San Gabriel Main Groundwater Basin. Second, 73% of all water supply for DAC and SDAC water systems in the WRD comes from groundwater. Water systems in poor communities depend more on groundwater rights than higher income water systems. Those systems have customers who cannot pay the costs for imported water

[40] Replenishment Rates for the WRD pumpers obtained from Ted Johnson, Assistant General Manager of the WRD in an email (T. Johnson, personal communication, October 23, 2019). It does not include each water system's separate costs to operate their wells, which he estimated could range from $50 to $250 depending on number of wells, water quality, and other issues.

[41] Data from both Fiscal Years exclude some direct charges by the West Coast Basin to individual retailers that add about 10% to the average retailer water bill (Source: https://www.westbasin.org/finance/water-rates-charges).

[42] Includes an administrative fee from the Central Basin of $190/AF, but excludes some other direct charges to retailers that add approximately $50,000 per month to total retailer bills (Source: https://www.centralbasin.org/about_us/departments/finance/budget_and_water_rates).

in Table 2. Third, nearly all of the water supply for the eight mutual water companies and county water districts in the WRD come from groundwater and many of those are DAC/SDAC. Cities obtain two-thirds of their water from groundwater rights. In contrast, according to our data on average number of connection by type of system, IOUs serve larger populations and most IOUs do not have enough groundwater supply to meet the demand. Therefore, an average of 51% of an IOU service areas' water comes from imported sources, 2% from non-potable recycled water, and 47% from groundwater. Some IOUs have no groundwater pumping rights at all.

As indicated above, IOUs and public water systems (city and water districts) do make some use of recycled water. Watermaster reports indicate that 4% of the total water sources in the WRD includes non-potable water which is sold by the MWDs in purple pipe for industrial, construction, and landscaping purposes. However, DAC/SDAC systems that use only groundwater (no imported water) do not have access to Central Basin or West Coast Basin MWD recycled water, nor the conservation subsidies, rebates, and education provided by MWD or the MWDSC. They obtain recycled water to the extent that WRD or others produce and store it in the groundwater basins. Therefore, while DACs using groundwater have more affordable rates, they have less access to new water sources like non-potable recycled water and conservation incentives.

Table 3.

Water Supply Source for Community Water Systems in the WRD

System Type	Percent GW	Percent Imported	Percent Recycled
WRD Wide Average	65%	31%	4%
IOU Average	47%	51%	3%
Mutual Water Co. Average	97%	3%	0%
City Average	66%	27%	7%
County Water District	92%	2%	0%
DAC/SDAC Average	73%	13%	>1%

Source: 2018 Central and West Basins Watermaster Annual Reports

I. Water Rates

We collected the 2019 water rates for 53 of the 57 water systems in the WRD, then collected the 2020 water rates for 55 of the 57 systems.[43] The purpose of analyzing water rates in this report is to be able to compare water rates among different systems. Other studies are trying to define and analyze what is actually affordable to households in a particular water system (Jones II, 2020).

This report compares water rates between systems to look at relative affordability. In this way, normalized water rates show how different consolidation options will affect water affordability in the

[43] Water Rates are usually on each water system website. Where not available on the website, email and phone contacts were used to obtain the rate. All rates are standardized for the water flow of 12 CCF per month, a widely established low water use per connection.

DAC/SDAC water system.

1. *Water Rate Changes from 2019 to 2020*

Despite the fact that wholesale water rates for both imported and groundwater have increased substantially on an annual basis, our findings in 2020 showed the average IOU Rate remained the same as it was in 2019, while the average change in all other system types year to year increased by 5%. Moreover, 13 of the 19 IOU service areas showed rate decreases. Based on interviews with the Public Advocate for the CPUC, it appears that the broad rate decreases among IOUs are the result of surcharges expiring at the end of 2019 on posted 2020 rate sheets. The Public Advocate reported that Investor-Owned Utilities have increased surcharges both in the percentage of the average customer bill and the number of surcharges appearing on rate sheets (California Public Utilities Commission & Public Advocates Office, 2020). We used the lower average IOU rates for 2020, but the average IOU rate reduction from 2019 is likely an anomaly. According to the CPUC Public Advocates Report cited above, those surcharges are likely to be renewed or new surcharges added.

In the following analysis, we use 2020 rate data as general trends across system type hold true from 2019 to 2020. A table comparing 2019 and 2020 rates is included in Appendix A as Table A-2. While the average IOU rate was 20% over the average rate for all WRD systems in 2019, the average IOU rate in 2020 is lower, 12% over the average rate. This percentage decrease is because between 2019 and 2020, the IOU average rate did not change, but the average rate for all types of systems increased. Table A-2 also includes the number of systems of each type that reported water rate data.

2. *Water System Rate Variance within the WRD Boundary*

Water rates vary widely in the WRD and in Los Angeles County as a whole. In 2020, the highest rate in the WRD was $93.28 per 12 CCF per month (City of Huntington Park). The lowest water rates is in the City of Paramount at $25.71 per 12 CCF. This large price range is hard to explain without detailed analysis of each system; however, there are some important general factors to note.

First, the source of water matters greatly, given the wide difference in price for groundwater versus imported water. Table 4 shows that different types of systems have distinctly different rates that are higher or lower depending on the average percent of groundwater used. Second, the cost of the water pumping rights matter. Third, the *percentage of the customers* served by groundwater versus imported water matters. A water system can have a large quantity of pumping rights, but not enough to serve all of the connections that they have. Fourth, rates differ considerably for different types of systems. Cities like Paramount and Downey have a large number of adjudicated pumping rights relative to water demand. They

were original pumping rights holders at adjudication, and they have enough water to serve most if not all customers. Some cities did not exist at the time of the adjudication and other entities held groundwater pumping rights. Other cities sold their water system and pumping water rights with the sale of their water system to others.

In Table 4, the 2020 average monthly water rate for the 55 systems that disclosed their water rate in the WRD is $64.60 per 12 CCF. IOUs still have the highest average rates, about 12% higher. However, IOUs are also required to give LIRA discounts[44] to qualified customers who are eligible and apply. When accounting for the LIRA rate reductions in the IOUs, IOU rates are still higher than the 2020 WRD average for LIRA qualified customers, but by 5% rather than 12%.

Table 4.

2020 Water System Rates by Type of System, LIRA Rate, and Source of Supply

System Type	Average Water Rate	Average Water Rate with LIRA[45]	Percent of Water Supply Groundwater
IOU	$77.64	$67.63	47%
Mutual	$47.93	N.A.	97%
City	$57.27	$57.27[46]	66%
Special District	$62.26	N.A.	98%
WRD-Wide Average	$64.20	N.A.	65%

Note: Rates are per 12 CCF /month

Table 4 also shows that mutual water companies, county water districts, and city systems have lower than average water rates, while IOUs have higher average water rates. Mutual water companies have the lowest rates. Average city water rates are lower than the county water district rates. Lower system rates may be beneficial to residents in disadvantaged communities. Alternatively, as demonstrated in Sativa, lower rates can mean that there is not enough revenue for system maintenance or replacement.[47]

One key reason why IOUs have higher than average rates compared to other systems is that barriers to rate increases are lower. They can regularly request rate increases from the CPUC. The largest systems (Class A IOUs) can request rate increases every three years to cover their

[44] The Low-Income Oversight Board was established in the Public Utilities Code in 1996 (https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=PUC&sectionNum=382.1.).
[45] Rate Data for LIRA found on the websites of the individual systems.
[46] We only identified one city, Whitter, that has established a LIRA Rate.
[47] Water rates lower than average may occur for many reasons. Ability to use groundwater rather than imported water is the most significant advantage resulting in lower rates. However, lower than average rates, especially for systems that have rates more than 20% below the average (in the WRD, around $51.00 per 12 CCF per month), can be a signal that the system is falling behind on such things as infrastructure replacement and maintenance for system reliability, water quality monitoring, and investments. Furthermore, systems that have problems due to inadequate revenue may also have a low level of customer confidence, leading the customers to rely on expensive bottled water.

costs plus a rate of return. Class B, C and D (smaller systems) can file an annual rate increase request (California Public Utility Commission, 2016). This is in addition to requests for surcharges.

Increased costs and a "reasonable rate of return" are the basis for CPUC rate increases. It is in the IOU's interest to invest in their water systems. They can submit the costs to the CPUC in a rate case to give evidence of a reimbursable expense on which to obtain a reasonable rate of return. Due to information asymmetries, there is little meaningful opportunity for water rate payers or advocates to protest improvements.[48] Therefore, IOUs generally provide a high level of service compared to other systems, but on average, also have a higher cost of service.

The incentives are reversed for cities, special districts, and mutual water companies. Their elected boards of directors or councilmembers have to vote local rate increases in publicly noticed meetings. They usually find much opposition and little support. The mayor and council of a city are themselves ratepayers and are subject to election by the voters who are ratepayers. They are reluctant to raise rates unless they absolutely have to do so. They have more incentive to hold down rates.

3. Low Income Rate Assistance (LIRA)

When comparing rates of different types of systems, we already noted that some IOU low-income customers could request a discounted rate. Table 4 shows the average rate for each type of system with and without the LIRA program. The average LIRA rate brings down the cost of water substantially. IOUs are still on average more expensive, but the average rate is much lower. LIRA discounts do vary by IOU. All IOU systems must have LIRA programs, but individual IOUs set their own discounts. Qualified customers can only obtain LIRA discounts if they know about it, file a request for the discount with their provider, and directly pay their water bill. Since a large proportion of low-income people are renters and do not qualify because they do not pay their utilities directly, and may not know about either the benefit or their provider, the benefits go to a narrower range of customers.

Some IOUs have deeper LIRA discounts than others do.[49] IOUs are allowed to recoup the LIRA discount from non-LIRA customers across their statewide service area. Non-LIRA customers pay a surcharge to offset the LIRA discount. Income qualifications for LIRA are more restrictive under federal poverty standards than the median family income definitions for DAC/SDACs.[50] In 2019, the qualified household income under federal poverty standards ranged from $12,490 (single person) to $43,430 for a family of eight. DAC median household income

[48] For instance, see Wolak, F. (1994). An econometric analysis of the asymmetric information, regulator-utility interaction. ***Annales d'Economie et de Statistique***, 13-69.

[49] https://www.cpuc.ca.gov/General.aspx?id=2417

[50] Federal Poverty Standards determine the thresholds of eligibility for the LIRA programs for water and energy. The Department of Health and Human Service promulgates these income standards for households to qualify for federal or state rate assistance. U.S. EPA and the State of California use another definition for disadvantaged and severely disadvantaged communities.

was $51,026 in 2016, in excess of the LIRA qualifications for all but the largest families. SDAC median household income was $38,270, which means that larger households could qualify for LIRA discounts.

Thus, only a portion of residents in DAC and SDAC systems will qualify for LIRA subsidies. The definition of a DAC/SDAC water system is 80% and 60% of statewide median household income, meaning half of households are above the median and half are below. Consequently, those families who earn significantly less that the median household income but do not qualify for LIRA will have even higher water rates to offset the subsidies allotted to even poorer people.[51] The burden will be higher on disadvantaged customers of smaller IOUs than in larger ones, which can spread the costs among a larger number of customers. This is an unintended consequence of the program design. The State Water Board and the CPUC are considering a Statewide LIRA Program, with uniform benefits and costs spread across all customers of any water system (California State Water Resources Control Board, 2020b; Pierce et al., 2020b).

4. Comparing Water Rates for Non-DAC, DAC, and SDAC Water Systems

Tables 5 shows rates for all types of water systems in the WRD, showing rate differences for Non-DAC, DAC, and SDAC systems. Ratepayers in DAC Water Systems, on average, *pay 2% less* on average than systems that are not disadvantaged. However, SDAC customers *pay 6% more* than systems that are not disadvantaged. The rate differences may be because IOUs own a significant proportion of SDAC systems and a smaller proportion of DAC systems.

Table 5.

A Comparison of Water Rates between Non-DAC, DAC, and SDAC Water Systems in the WRD

Median Family Income Level for Water Systems	Average Water Rate per 12 CCF
Non-DAC	$64.66
DAC	$63.10
SDAC	$68.18
All Water Systems in WRD	$64.60

Note: City of Los Angeles is not included in the rate analysis since most of the City lies outside this area

5. IOU Water Rates for Non-DAC, DAC, and SDAC Communities in IOU Water Systems

If one looks at the rates for IOU non-DAC, DAC, and SDAC systems in Table 6 below, it shows how much higher IOU rates are than rates for all types of systems. It also shows more clearly

51 They will be paying a share of the reimbursement of the LIRA discount for the poorest people, along with all ratepayers of that IOU.

how much more IOU SDACs pay than IOU non-DACS or in all SDAC systems across the WRD.

In summary, the data in Table 6 shows that:

- DAC and SDAC communities pay more when they are in IOU water systems.
- DAC communities in IOU Systems pay **22%** more than the WRD Average.
- SDAC communities in IOU Systems pay **26%** more than the WRD Average.

Table 6.

A Comparison of IOU Water Rates for Non-DAC, DAC, and SDAC Water Systems in the WRD[52]

Median Family Income Level for Water Systems	Average Water Rate per 12 CCF
IOU Non-DAC	$75.75
IOU DAC	$78.86
IOU SDAC	$81.47
All IOU Water Systems in WRD	$77.64
All Water Systems in WRD	$64.60

Despite the fact that there is a wide range of rates between the individual IOUs in the WRD, those IOUs serving DAC/SDAC service areas are charging a higher water rates than those serving median household income service areas. Rates for all IOU systems in the WRD are significantly higher than the average of all systems serving Non-DAC water systems.

J. Water Rates and Water System Size

Table 7 shows that water rates vary less by system size than with the factors previously discussed (DAC status, type of system and source of water). IOU service areas tend to serve more connections than other water systems in this area except Long Beach. Mutual Water Companies do not serve more than 10,000 connections and special districts tend to be smaller, serving a maximum of 5000 connections. Water rates appear to vary more between *types of systems* than between the *different sized systems*. Rates do seem to decline with size for the IOU systems service areas. Rates increase as mutual water system size increases. Rates for city water systems also increase with size.

[52] This table does not reflect LIRA Rates, which do apply to larger households in SDAC water systems. These averages are across all connections in a system, and it is not possible to determine what proportion actually qualify and apply for LIRA.

Table 7.

Water Rates and Water System Size Per 12 CCF

Type of System	Systems with 251-1,000 Connections	Systems with 1,001-5,000 Connections	Systems with 5,001-10,000 Connections	Systems with 10,000+ Connections
IOU	N.A.	$84.67	$80.04	$74.09
Mutual Water Company	$40.05	$49.51	$49.04	N.A.
City Systems	$73.09	$57.38	$61.55	$60.02
Special Districts	N.A.	$65.65	N.A.	N.A.

Note: Average IOU rates are without LIRA. However, since LIRA is based on a set percent, this does not affect whether the price goes up or down as number of connections go up.

VII CONSOLIDATION POTENTIAL FOR DISADVANTAGED AND SEVERELY DISADVANTAGED WATER SYSTEMS

Up to this point, we have identified different types of systems in the WRD. We have identified those that are DAC or SDAC, those with groundwater pumping rights, imported water, or both, system size, and water rates for 55 of 57 systems.

As pointed out earlier, the only substantial documentation of a water system failing or with risks in this subregion was Sativa County Water District. The rest of this analysis focuses on the other side of the equation: are there water systems in this subregion with an incentive to acquire a DAC/SDAC system *if one is in trouble and needs consolidation*? We pose three questions about potential consolidators:

- Are there systems motivated to acquire a failing nearby DAC/SDAC system?
- Do they have the capacity to improve that water system if they do acquire one?
- Can they improve the system without making water rates unaffordable for the DAC/SDAC system customers?

The best "consolidator" systems are ones that are already providing safe, affordable, and reliable water to their customers and are incentivized to increase the quality of infrastructure and add new infrastructure (i.e., treatment, storage, interconnections) to the system they want to take over. In addition, the best consolidators would be competent at obtaining the grants and public or private financing/credit to cure deficiencies in infrastructure. The consolidator would be able to train existing water system operators to improve performance if needed or bring in new staff. They would have expertise to plan, design, and permit water system infrastructure improvements. They would have to phase in improvements so that their current system and "incoming system" customers would not face high water rates all at one time that are unaffordable to all.

A. Which Types of Existing Water Systems in the WRD Could Be Willing and Good Consolidators for Failing DAC/SDAC Water Systems?

It may be difficult to annex a water system to a city or special district in the WRD. For DAC/SDACs in the WRD cluster, nearby cities and special districts are also likely to be DAC or SDAC. For cities and special districts, adjacency of a system is a necessity, so cities that are both further away and Non-DAC would not be viable candidates. It is a stretch to think that another DAC/SDAC public system would be a viable consolidator. Even if the State Water Board provided grants for most initial expenditures on capital improvements, as well as technical assistance and temporary funding for operations and maintenance, that might not be enough to avoid rate increases for their own ratepayers.

An exception might be the Central Basin Municipal Water District, the wholesaler of Metropolitan Water District imported water for the retail water systems in the WRD. As noted in the Sativa case

study, they bid to acquire the Sativa Water District. They do encompass all of the water systems in the Central Basins. However, they have no retail water system management capacity and no experience running multiple water systems that are not contiguous to each other.

Mutual Water Companies are not set up to take on an expanded customer area. Getting approval from the current property owners to serve an additional area, when many owners no longer live on their own properties in the WRD would be difficult unless there was a substantial net economic benefit over cost. In addition, Mutual Water Company TMF capacity to serve a larger area and more connections is low, because most mutual water companies are quite small.

The case is different for IOUs. As stated earlier, Class A and B IOUs already run on a model of distributed water service areas throughout regions and states with centralized management. Therefore, IOUs do not need to abut a failing system to consider acquiring it. In addition, IOUs in the WRD are particularly motivated to acquire more adjudicated groundwater pumping rights. Table 3 shows that, on average, IOUs can only serve an average of 47% of their customers with their existing groundwater pumping rights. That is significantly lower than all other types of water systems in the WRD that all serve a higher percentage of their customers with groundwater.

Finally, as stated earlier, CPUC regulations motivate IOUs to make investments in their water systems. Similarly, regulations motivate IOUs to bring failing systems into their system and attempt to raise them to standard. If capital improvements costs are included in new rates approved by the CPUC, so is their guaranteed rate of return on those investments and additional operations/management costs. For IOUs, acquiring poorly run systems and getting approval to make improvements is an opportunity, not a cost.

Based on all of the above, IOUs have the most incentive to acquire DAC/SDAC systems. The DAC/SDAC community water systems that IOUs acquire may end up improved infrastructure, water quality and water reliability. CPUC regulations provide incentives to IOUs to keep their systems in good shape.

B. Which Potential Consolidators Offer Affordable Rates to DAC/SDAC System Customers?

Assuming that cities, county water districts, county waterworks districts, and mutual companies probably lack either capacity or motivation to be a consolidator, IOUs are the most likely consolidators. Two questions will be examined in this section about IOUs and affordability.

First, will IOUs be able to provide better water quality and reliable water supply at an affordable cost as compared to the water rates now charged in Non-IOU DAC/SDAC water system? On the other hand, will an IOU rate be substantially higher than the rates Non-IOU DAC/SDAC customers currently have?

Figure 8 shows the high degree of water rate variation between water systems in the WRD. Water rates are a good way to compare the affordability of water affordability *between* water systems in the WRD. Note that there is a large cluster of high-rate water systems (over 21% higher than the average) around the Norwalk[53] label. That cluster is surrounded by a perimeter of very low rate systems (21% or more *lower* than the average). This includes many areas where dark red and dark blue, highest rates and lowest rates, have a common boundary. Since the water rates in the WRD ranged between $25.71 per 12 CCF per month and $93.28 per 12 CCF per month, the cost differences for residents in close proximity to each other at the water system boundaries can be very significant. All other things equal, a better potential consolidator IOU would be one with rates closer to the average.

Figure 9 shows the proximity of IOU water system service areas to the Non-IOU DAC/SDAC systems that may need consolidation. The IOU relationship to DAC/SDAC systems is complicated:

- The Light Blue areas with diagonal yellow stripes are SDACs served by IOU systems.
- The Purple areas with horizontal yellow stripes water systems are DACs served by IOUs.
- The Deep Purple areas without stripes are DAC/SDACs served by Non-IOU systems.
- The Yellow areas without stripes are IOUs serving Non-DAC communities.
- SDACs and DAC systems are clustered together in the north/central part of the WRD, separated by the Shoestring Strip and area to the north in the LADWP.
- There are IOUs within this core of SDAC/DAC systems, but most are already serving DAC/SDAC systems.

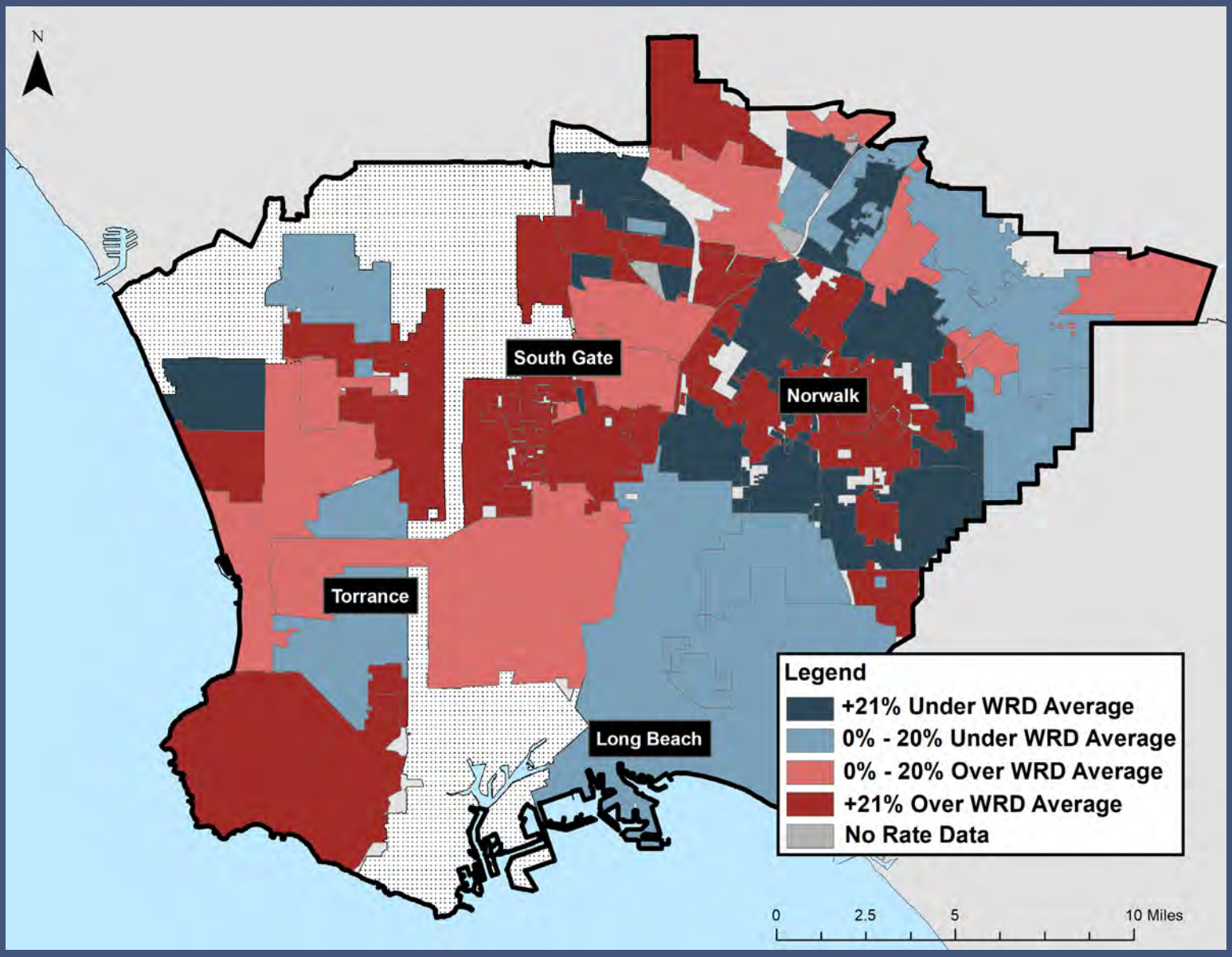
Figure 9 also shows that some IOUs are proximate or right next to Non-IOU DAC/SDACs. However, given the IOU distributed service area business model, there are a number of IOUs serving Non-DAC communities further away from this core, less proximate, but still within range of the core. With or without proximity, IOUs are close enough to acquire Non-IOU DAC/SDAC water systems in this area.

Figure 10 combines Figure 8 and Figure 9 data layers. It shows the water rates of each water system. It also shows the location of Non-IOU DACs/SDACs and the proximity of all IOUs to the former. Figure 10 also shows the location of IOU systems already serving DAC/SDAC service areas and proximity of those systems to Non-IOU DAC/SDACs. Finally, it shows where IOUs serve Non-DAC/SDAC service areas and their proximity to Non-IOU DAC/SDACs. In summary, Figure 10 shows the following:

- Pink and red water systems have water rates that are either up to 20% higher than the average or more than 21% higher than the average WRD rate.
- Light Blue and Dark Blue water systems have rates that are either up to 20% less expensive

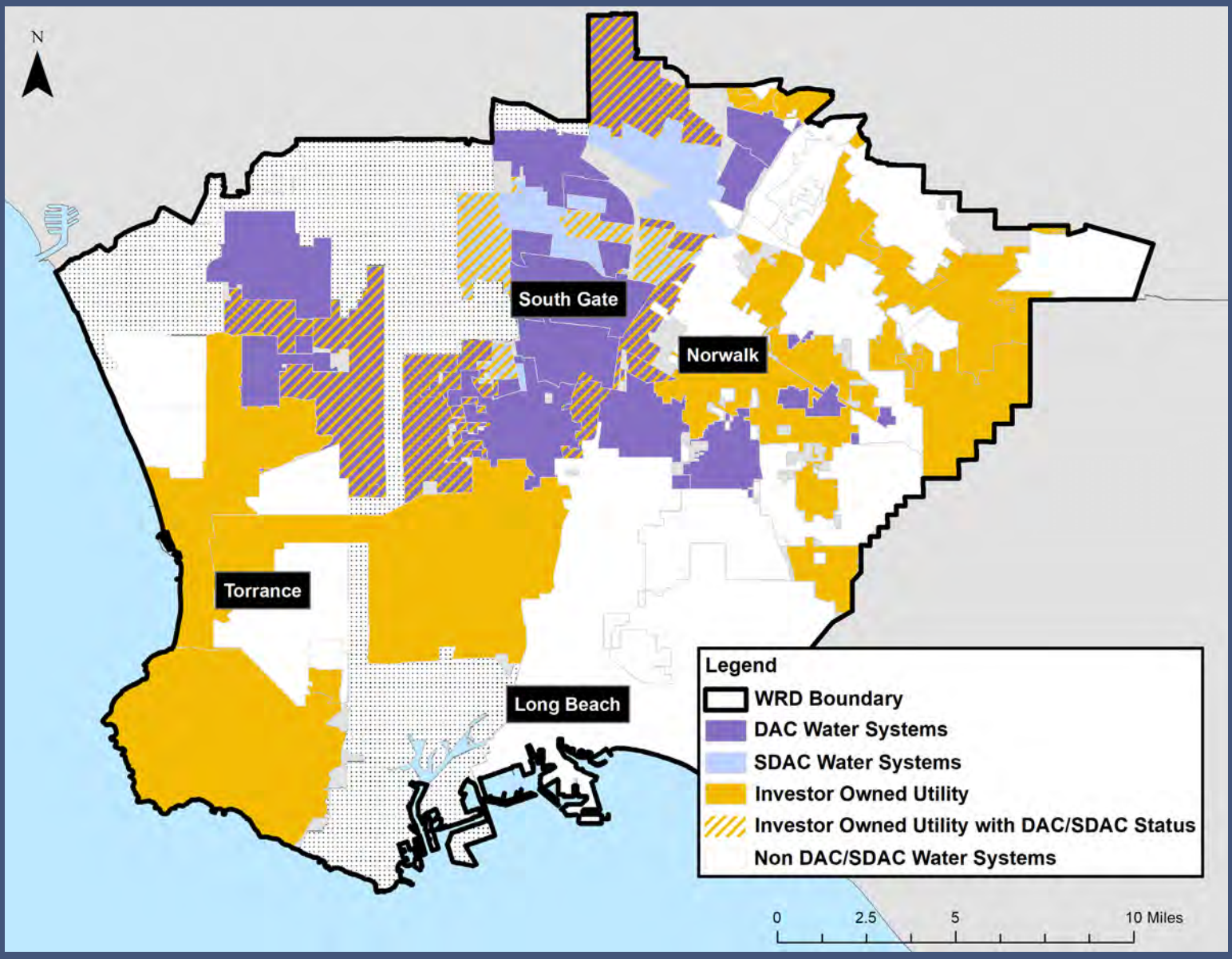
[53] We are identifying the label on the map, not the City of Norwalk, which is in the vicinity.

Figure 8. Geographic Variance from Average Water Rates for All Systems in the WRD



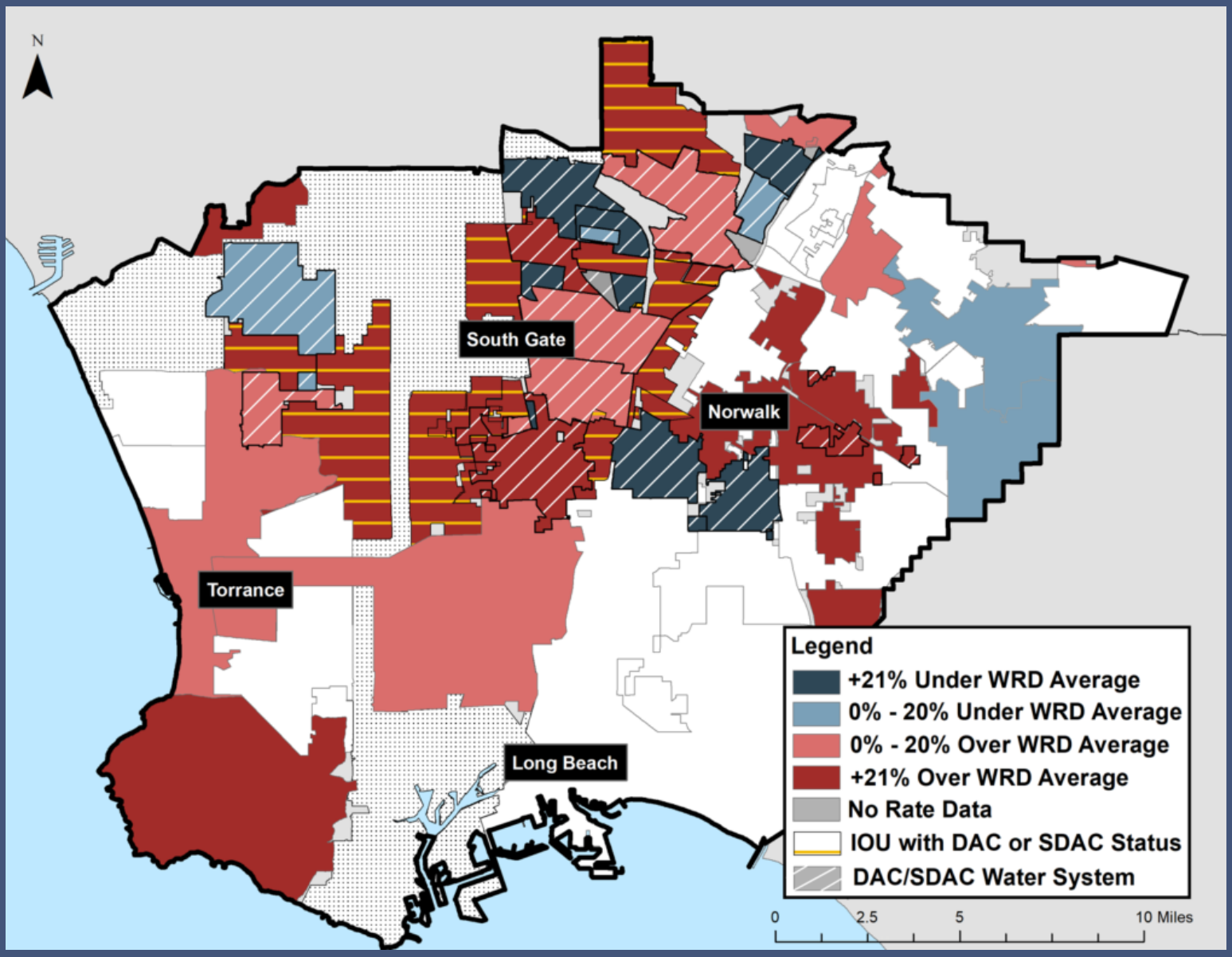
Maps based on shapefiles and DAC/SDAC data from Reibel et al. 2020.

Figure 9. Investor-Owned Utilities Proximity to DAC/SDAC Water Systems in the WRD



Maps based on shapefiles and DAC/SDAC data from Reibel et al. 2020.

Figure 10. Investor-Owned Utilities Consolidator Potential for DAC/SDAC Water Systems at Risk



Source Data: Reibel et al., 2020

or over 21% less expensive than the average WRD rates.

- Eighteen Non-IOU DAC/SDAC systems have the diagonal white hatching over the rate range color. Three of eighteen or 17% are Non-IOU DAC/SDAC water systems with *higher than average water rates*; one of these is more than 21% higher. The other 15, or 83% of the Non-IOU DAC/SDAC systems, have rates *below the average water rate*, with seven more than 21% lower.

- The IOU DAC/SDAC systems have the horizontal yellow hatching over the rate category. Note that all of these systems have rates more than 21% over the WRD average rate.

- The IOUs serving Non-DAC/SDAC service areas shown in solid pink (not hatched) are *somewhat higher* than the average rate, while those in the solid red (not hatched) *are more than 21% over* the WRD average rate. Those in light blue *have rates somewhat lower than the average.*

C. Other Considerations when IOUs Want to Acquire Disadvantaged Water Systems

There are a few IOUs with affordable rates for customers of DAC/SDAC water system, with those few able to improve the quality and water supply of DAC/SDAC systems if motivated to do so. However, there are other considerations in deciding if DAC/SDAC system consolidation with IOUs are good public policy.

1. CPUC Regulations of IOU Water Utility Acquisitions and Mergers: Whose Interests does the CPUC Protect When an IOU Acquires a Non-IOU Water System?

Current CPUC policy prevents the Commission from considering the impact of an IOU Acquisition of a Non-IOU water system, including Non-IOU DAC/SDAC water systems.[54] This legal precedent does not allow the CPUC to protect the groundwater rights of a Non-IOU system for the benefit of the ratepayers. It does not address the impact of increased water rate on the Non-IOU system. Because Non-IOU DAC/SDAC systems have lower rates than most IOUs, the marginal effect of a rate increase for the acquisition and investments necessary in the Non-IOU will be greater for the Non-IOU ratepayers than the current IOU customers.

On the other hand, the CPUC has been holding hearings to examine options to make its Low Income Rate Assistance program (LIRA) more consistent across the state and extend LIRA benefits to renters in multifamily units. The CPUC has also examined the benefits and costs of IOU acquisitions of DAC and SDAC water systems with the regulated utilities and State Water Board. The CPUC has a pending decision and order in the public hearing process on all of these issues (California Public Utility Commission, July 3, 2020). Depending on the decisions

[54] A litigation settlement adopted in Case D.99.064 stipulates, "neither Section 852 nor Section 854 of the Public Utilities Code requires a privately-owned utility to obtain authorization from the Commission before acquiring a publicly-owned utility." The CPUC does not regulate the addition of territory to the service of an IOU except to determine the impact of the added customers on the rate of the existing customers, not the ratepayers in the proposed additional territory.

made on these issues prior to the CPUC Sativa purchase proceeding, those decisions may alter the way that the CPUC considers Sativa and other future IOU acquisitions of Non-IOU DAC/SDAC systems. If this does not occur, any DAC/SDAC ratepayer and groundwater rights protection in an IOU acquisition will have to be included in the sale agreement before the CPUC hears the case.

2. Traditional Two-Party Acquisition versus Competitive Bidding

The Sativa Case Study described how Los Angeles County, the Sativa Administrator, used a competitive bidding process to select the winning bidder to acquire the water system. The competitive bidding process motivated bidders to bid at the lowest possible price where they could provide safe and reliable water. This process presented afforded the Sativa Administrator an opportunity to compare proposals made by all bidding water systems and select the one with the least expensive water rates and best commitments to improved level of service. The selected bidder is one of the two IOUs in the WRD with the lowest water rates.

In contrast, the usual practice for IOUs is a typical private purchase: a single IOU finds a willing water system seller and negotiates the price and terms of sale with the authorized parties for that water system. The IOU submits the purchase agreement to the CPUC for approval. Before approving the purchase, the CPUC takes testimony and examines the evidence given. The CPUC receives input from the IOU, members of the public, including the representatives and ratepayers of the system proposed for acquisition and ratepayers now served by the IOU, their own staff, and the Public Advocate. Based upon the evidence, law, and regulations, the CPUC then determines whether or not the purchase agreement reflects market value of the system to be acquired, as well as identifies potential impacts on the existing IOU ratepayers. However, competitive bidding is not required.

The pending proceeding at the CPUC regarding California-American Water Company's application to acquire the City of Bellflower's water system is relevant. In that case, a CPUC Proposed Decision (PD) to deny the application is being contested by California-American and the City of Bellflower. The PD concludes, "[t]he purchase price of $17 million is unreasonable." The CPUC Public Advocate states in the same document, "Both Bellflower and Cal Am were incentivized *to reach the highest purchase price* possible in this transaction" (*emphasis added*) (California Public Utilities Commission Public Advocate, July 3, 2020). The reasoning behind this assertion is important.

The parties to this acquisition assert that the CPUC only needs to find that the transaction is between a willing buyer and a willing seller and that there are economies of scale that benefit the ratepayers. The Public Advocate, in defending the PD, disagrees that a willing seller/willing buyer is a sufficient standard for market value (California Public Utilities Commission & Public Advocate, July 3, 2020). Their brief points to the language of eminent domain law

in the Civil Code of Procedure defining market value.[55] While the City of Bellflower was a willing seller, their system is deeply in debt with a large backlog of needed infrastructure replacements and improvements. Bellflower was very motivated to sell the system to recoup the City's drinking water system debt and to be absolved of responsibility to fix the system. California-American was motivated to pay the amount to cover the City's debt, as they would be able to recoup that cost over time through increased water rates for all their customers. Both parties were motivated to raise the price and the City of Bellflower was under "a particular or urgent necessity" to conclude the transaction. This kind of urgent necessity may be the case with any DAC in serious trouble. In this case, City of Bellflower customers, along with the rest of the California-American customers, would pay for the higher priced acquisition through higher water rates.

3. Adjudicated Groundwater Pumping Rights Moving from the Public/Nonprofit Sector to an IOU

The adjudications of both the Central and West Coast Basins, coterminous with the WRD Boundary, allow the purchase, lease, and sale of pumping rights to parties that intend to lease or sell the rights to a pumper for a higher price.

If an IOU acquires a Non-IOU DAC/SDAC water system, they also usually acquire the water rights from that system. In this case, water pumping rights would move from publicly owned or nonprofit water systems to private ownership. While this is a key motivation for the IOU, transfer to private ownership runs against the historic trend in Los Angeles County as a whole. In the decades since adjudication of the groundwater basins, the trend for most adjudicated groundwater rights has been to sell private pumping rights to public entities. From year of adjudication to 2013-14, publicly owned adjudicated rights increased from 41% to 80% in Central Basin. On the other hand, West Coast Groundwater Basin is somewhat of an anomaly in the County, with many rights still held by industrial users. Public entities owned 23% of the rights at the time of adjudication and only 24% by 2013-14. A large sale by an oil company to an IOU in West Coast Basin has kept the rates mainly in private hands (Porse et al., 2015).

Transfer of groundwater pumping rights from the public to the private sector is not, by definition a bad thing, if the water system ratepayers' interests are protected. However, the CPUC cannot protect the interests of the ratepayers in a Non-IOU water system acquired by an IOU. The legal restrictions that prevent the CPUC from considering the effects of an acquisition of a Non-IOU DAC/System on their ratepayers is problematic. The CPUC cannot ensure that

[55] Code Section 1263.320 states: "(a) The fair market value of the property taken is the highest price on the date of valuation that would be agreed to by a seller, being willing to sell but under no particular or urgent necessity for so doing, nor obliged to sell, and a buyer, being ready, willing, and able to buy but under no particular necessity for so doing, each dealing with the other with full knowledge of all the uses and purposes for which the property is reasonably adaptable and available. (b) The fair market value of property taken for which there is no relevant, comparable market is its value on the date of valuation as determined by any method of valuation that is just and equitable."

groundwater pumping rights held by DAC/SDAC systems are held by an IOU to benefit the acquired water system ratepayers, rather than be leased out or sold for profit at the expense of all their ratepayers. However, even if the CPUC cannot protect these rights, an appointed Administrator can do so when negotiating a sale on behalf of the ratepayers.

Spatial analysis of Non-DAC, DAC and SDAC systems in Southern Los Angeles County allowed a clearer understanding of the distribution of key performance and constraint variables, as well as the relationships between them. Understanding the spatial relationships helps to highlight the problems of disadvantaged water systems and the advantages or disadvantages of potential consolidation.

- The geographical location of Non-DAC and DAC/SDAC water systems in Los Angeles County and the WRD.
- The distribution of different legal types of water systems.
- The geographical distribution of water system water rates by type of system and DAC/SDAC status.

We conclude that IOU water systems have the operational capacity and the motivation to become water system consolidators for DAC/SDAC water systems that are at risk and need consolidation. With that, the report focuses on the location/distribution of IOUs, their proximity to Non-IOU DAC/SDACs, and their water rates to find those that are most likely good consolidators.

The report also concludes that smaller city and special district water systems in the WRD have little motivation to be consolidators for adjacent systems and have some substantial disadvantages. Unlike IOUs, public water systems cannot make substantial investments in upgrades for disadvantaged water systems without state grants to cover all costs. This would only work if the acquired system were directly adjacent to the public water system consolidator and had other significant advantages, such as a surplus of groundwater pumping rights that the public system wanted.

A. Insights on Consolidation

- IOUs are the best type of system to be consolidators in regions with broad poverty levels, but there are other limitations. The current water rates charged by IOUs now serving DAC/SDAC communities are much higher than the median rate for WRD water systems and higher than water rates in higher income communities in the WRD. DACs in IOU systems pay **22%** more than the WRD average, and SDACs in IOU systems pay **26%** more than the WRD average. Communities at or above the State median household income pay the average rate in the WRD.
- There is an inverse relationship between the proximity of Non-IOU DAC/SDACS to IOU DAC/SDAC systems and their relative water rates. The closer an IOU system is to a Non-IOU DAC/SDAC system, the higher the rate. Those IOU DAC/SDAC systems having the red color (highest rates) overlaid with horizontal yellow lines (IOU) abut the majority of other DAC/SDACs and have rates more than 21% over the WRD average rate.[56]

[56] Rates are calculated here without the LIRA rate, since no households in DAC water systems are eligible.

- Only a few IOUs in the WRD provide water at a price on the lower or middle of the IOU rate range. With all other things equal, those few IOUs are likely to be the best consolidators for those DAC/SDAC systems that are failing and need one.
- Conversely, the WRD Risk Assessment may find that some DAC/SDAC system set rates too low to provide clean and reliable water. Or, they may find that a number of these Non-IOU DAC/SDAC systems can provide high water quality and reliable supply at their current rate. Once the WRD assessment is complete, researchers should use the Risk Assessment with annual water rate normalized by volume to provide a recommendation.

B. Groundwater Water Quality for WRD Water Systems

- State Water Board water quality data show almost no water systems in WRD out of compliance with primary water quality standards. However, a review of Los Angeles County water system manganese testing data from 2010 to 2020 shows that several systems in the WRD, and in the rest of Los Angeles County, have had big exceedances of the secondary pollutant, manganese, beyond the EPA Advisory Notification Level of 50 parts per billion. . Some reported exceedances are high. Some wells have multiple exceedances. At this frequency and concentration, water is both unappetizing to drink, and, according to the EPA, has health effects (California State Water Resources Control Board, n.d.-a).
- In addition, it appears that Volatile Organic Compounds, which have primary pollutant status and are costly to treat, are a risk for some WRD-located water systems using groundwater.

1. Water Quality Impacts in the Distribution System

- Without source treatment for manganese where it is present, the pollutant accumulates in pipes. Additionally, manganese and other pollutants like bacteria can accumulate in dead-end pipes. These impacts can be aggravated when water system operators lack skills for pipe flushing and pipe leak repair.

C. Spatial Distribution of DAC/SDAC Water Systems

- Spatial analysis in this report revealed that WRD DAC/SDAC systems are tightly clustered together. This contrasts with rural areas, where DAC/SDAC systems are scattered. Concentration of poor water systems makes consolidation with a directly adjacent system more problematic. Combining several DAC/SDAC systems together to make one bigger DAC/SDAC system may not solve any problems, and could make them worse.

D. Water Rates in the WRD

The report relies on standardized water rate data to understand whether the water rates in current water systems are potential consolidators and whether rates are affordable for DAC/SDAC system

ratepayers.

- Water rates in the 57 water systems in the WRD vary widely. In 2020, the average water rate was $64.60 per 12 CCF per month. However, there is wide variation in water rates, from a low of $25.71 per 12 CCF per month in the City of Paramount in 2020 to a high of $93.28 per 12 CCF per month in the City of Huntington Park.

E. Insights from the Sativa County Water District Case Study

- Manganese at the well and accumulated in the distribution system created a major water quality problem with environmental justice and health Implications.
- It took more than 15 years of deteriorating water service and infrastructure in the Sativa water system for action to dissolve the Sativa County Water District. Some of these problems were discussed as far back as 2005 in a LAFCO review (Jennings, 2019).
- LAFCOs do not dissolve government agencies easily. There is great deference to elected boards, and Sativa's Board Members and General Manager strongly resisted interference. LAFCO urged the Sativa Board to improve their management, with no success. However, even if LAFCO wanted to dissolve and consolidate Sativa, they could not do so, except with another public agency under their jurisdiction. LAFCO Board members were also concerned that consolidation would result in water rates beyond the capacity of residents (Jennings, 2019).
- Sativa's low, flat water rates kept the voters satisfied with the current Board of Directors until the water quality problems were impossible to ignore. However, the low, flat water rates that were important to residents were also part of the problem. There was not enough revenue to maintain or operate the water system properly, even if the District governed and managed its revenue better (Lafferty, 2020). Finally, community ratepayers and elected officials incensed about the brown water forced action by the Legislature. In short, the Legislature, motivated by the crisis, passed urgency legislation to allow a solution for a Sativa.[57]

[57] Id at Note 50.

RECOMMENDATIONS

IX

A. Manganese is an Environmental Justice and Health Issue

- If manganese pollution levels exceed the EPA Advisory Notification Level multiple times, the State Board should consider requiring testing in both source water and the distribution system.
- If not already public, records of water system manganese grab sample results should be a part of the regulatory public water quality databases. The State Water Board should accord manganese exceedances at the well or at the tap a higher priority as a risk indicator for DAC/SDAC System Risk Assessments.
- Ensure that the water systems notify local government and customers when there are multiple exceedances, as required by the EPA. The State Water Board should continue to provide grants for manganese treatment systems to DAC/SDAC water systems based on environmental justice grounds and potential health concerns, as well as ensure that the DAC/SDAC water systems have expertise to operate and maintain the treatment system.

B. If Possible, Address DAC/SDAC Risks Early to Avoid Escalating Costs

The new law authorizing the State Board to appoint Administrators for water systems at risk now makes it possible to intervene earlier than in Sativa. Successful intervention requires the following:

- Widespread public perception of problems at the water system and efforts to cure those problems. This requires a well-informed media and public.
- A comprehensive, updated Risk Assessment process.
- The State Water Board is successful in attracting competent Administrators for water systems at risk who are able to gain the confidence of the community.
- The State Board has adequate information about the state of the water systems before the Administrator is appointed.
- The State Water Board provides enough financial and other support for the work of Administrators.

C. Obtain Early Independent Financial Audits of DAC/SDAC Systems at High Risk or Out of Compliance

Los Angeles County, as administrator for Sativa, found that the best way to identify potential problems with water quality, water supply, and adequate infrastructure investment and maintenance is through a financial audit. If the water system has not invested in replacement of old infrastructure

and no major maintenance projects have happened, there are likely to be problems with the system that affect water supply and/or water quality (Lafferty, 2020). A State-ordered independent audit *in advance* of appointing an Administrator would have made a huge difference in accelerating action. Both the State and the Administrator would have had a more accurate picture going in about the needed financial investments.

It is clear that the State Water Board has the right to order water systems to produce financial information. However, they may not have the right to require water systems to hire an independent auditor or cooperate with a third-party audit. Independent audits ordered by a state agency may require legislation. Other states do have legislative authority to require water system cooperation with an outside audit. North Carolina has the ability to directly monitor financial resources and take over the system if deemed necessary (Walton, 2019).

D. *In Los Angeles County, the Water Replenishment District of Southern California Should Attempt to Conduct Voluntary Financial and Infrastructure Audits for Non-IOU DAC/SDAC Systems in Their Jurisdiction*

Over the last several years, the WRD Disadvantaged Water System Program has helped many different disadvantaged systems with grants for capital improvements and gained those system owners' trust. The state funds are available to WRD to assess whether or not DAC/SDAC system can manage their systems to produce clean, reliable water *after* the WRD has delivered major infrastructure projects. It will be a challenge for the WRD to persuade water systems to cooperate on independent financial audits and infrastructure inspections, but DAC/SDAC systems have been working with the WRD, resulting in solutions to long-term problems, and this has promoted more trust (M. Kennedy, personal communication, 2020).

Not all 29 DAC/SDAC systems need examination. Eleven DAC and SDAC systems in the WRD are IOU service areas. Given that IOU DACs/SDACs have some of the highest water rates in WRD water systems, one would hope that these systems wound not have the kinds of water supply and quality deficiencies seen in other DAC/SDAC systems. The CPUC should also be reviewing the rates of IOUs that serve DAC/SDACs to determine what is driving higher rates for poor communities. Affordability is also in the domain of the State Water Board.

E. *The State Water Board Should Obtain Accurate Water System Boundaries and Implement Countywide Mapping of DAC/SDAC Systems in Urban Counties for an Improved Statewide SAFER Risk Assessments and Funding Priorities Plan*

The refined methodology for mapping DAC/SDAC/Non-DAC systems and the maps of Los Angeles County (Reibel et al., 2020) used in this report can be applied in other counties to:

- Improve the accuracy of water system boundary maps.

- Identify the gaps and potential inaccuracies in system boundaries of adjoining systems.
- Accurately identify and map all DAC/SDAC water systems with the least error possible.
- Show whether the distribution of DAC/SDAC water systems in each county is concentrated together or spread apart.

Once completed, these maps provide an excellent platform to display SAFER Risk Assessment indicator data (California State Water Resources Control Board Drinking Water Division, July 16, 2020) and to compare risk type and level between different DAC/SDAC water systems.

F. *Improvements for the State Water Board Administrator Program*

The Administrator Program is in its infancy, but there are results from the Sativa Administrator experience described in the prior section that the State Water Board can use to remedy the problems faced by Los Angeles County at Sativa County Water District.

1. *Protect Administrators from Legal Liability from the Acts of the Prior Governing Board and Management of the Water System*

Unexpected liability problems arose from LAFCO's decision to dissolve the Sativa County Water District. As soon as Sativa became a temporary part of Los Angeles County, some residents added the County to a lawsuit filed against the former County Water District for the problems earlier caused by the District Manager and Board. A creditor also named the County as a defendant in a lawsuit against the District. Based on this experience, dissolution of the existing water system should only occur when there is a consolidator ready to take the water system over and liability issues are addressed.

Board staff are already considering measures to potentially indemnify the Administrator against liability if the failing water system has outstanding debts and lawsuits against it. Ultimately, it may require legislation to indemnify administrators from *personal liability* from the acts of the previous responsible parties or unpaid debts.

2. *Administrators Should Use Competitive Bidding to Select a Long-Term Receiving System Whenever Possible*

In rural areas, there may only be one possible consolidator water agency close enough to take over a failing system. However, in urban areas, there could be several interested bidders, as in the case of Sativa. In the latter case, the Administrator should go through a competitive bidding process to obtain bids for the water system as any public agency Administrator would be required to do. Having multiple bidders will require bidders to compete with the best proposal to upgrade a DAC/SDAC water system in trouble at the lowest water rate possible. The consolidation is more likely to reach the real market price when there are multiple bidders trying to best each other, with one providing better commitments at a lower price.

Competition limits incentives for a higher acquisition price to pass onto ratepayers. Having an independent third party, like the Administrator, select the winning bid also helps to obtain the best possible level of water service with the best water rates possible.

3. *Allow Administrators to Subcontract with Specialized Experts and Staff Trainers as to Help Carry Out the Work of the Administrator*

The Administrator Handbook states that the Administrator is a single person to manage and supervise the existing water system staff.

Based on the Sativa experience, the State Water Board should not assume that a single administrator is able to rely on the existing water system staff for all needed work, particularly at larger urban water systems. For a very weak water system, staff may be part of the problem. The Administrator may need to bring in experts to help employees improve or replace them with staff that are more qualified. Until the Administrator takes over, there is no way to assess what the water system staff can do, what is needed, and whether there is enough money to replace staff with more highly trained people.

State Water Board Division of Drinking Water staff are considering allowing Administrators to subcontract with the experts that are needed (Abhold et al., 2020). The more information that the State Water Board shares with bidders about the nature of water system problems in a request for proposal, the better able prospective administrators will be to propose needed expertise and subcontractors.

G. *Consolidation of Non-IOU DAC/SDAC Water Systems with IOUs*

1. *The State Water Board and their Appointed Administrators should construct purchase agreements with IOUs purchasing a DAC/SDAC systems recognizing that the CPUC is operating under legal precedent precluding consideration of the interests of Non-IOU DAC/SDAC.*

The State Water Board and their Appointed Administrators should represent the water system that needs consolidation when purchase agreements are being developed and signed. A purchase agreement should include provisions in the purchase agreements that protect the ratepayer needs and rights, including LIRA rates for low-income customers, commitments to investments, and small water rates added incrementally over time to be affordable. A purchase agreement should state that the groundwater pumping rights sold as a part of the water system are for the benefit of the ratepayers, not leased or sold for private gain by the acquiring water system.

The State Water Board and Administrators should carefully monitor CPUC proceedings when cases where IOUs are acquiring DAC/SDAC water systems are pending. The State Water Board

should consider commissioning post-consolidation studies to understand and learn from the actual results for customers.

2. ***If possible, the CPUC should reconsider legal precedent preventing them from considering the interests of the Non-IOU ratepayers in an acquisition.***

3. ***The findings of this report underscore the need for a redesigned LIRA program.***

   The State Water Board and CPUC are working together to improve the LIRA program. They need to address many different issues: uniform LIRA discount rates across the state, greater ease of LIRA enrollment, and expanded application to renters who do not pay their water bills directly. Expanding LIRA benefits to customers of publicly-owned water systems would be a significant improvement, if legal issues can be resolved. The State Water Board published their Statewide Low Income Water Rate Assistance Program Recommendations to the Legislature (Pierce et al., 2020b).

H. *When Possible, the State Should Use Approaches Other Than Physical Consolidation to Improve DAC/SDAC and Other Small Water Systems*

In the UCLA Water Resources Group Stakeholder Discussions in 2017 and 2018, small water system board members, managers, and attorneys suggested that an entity to provide pooled services for a fee would help all small water systems obtain services that they could not provide on their own. They suggested that pooling funds for some services and obtaining technical assistance from the State for DAC/SDAC systems could be an answer for systems with the capacity to take advantage of assistance. That concept is in some ways similar to the "managerial consolidation or water partnerships" approach suggested by the State Water Board (California State Water Resources Control Board, n.d.-c). The State Board should pursue this when DAC/SDAC water systems could resolve their problems with more pooled services, grants, temporary operations and maintenance support, and technical assistance.

1. ***Two Existing Examples of Pooling of Water System Resources for a Fee for Service in Los Angeles County***

   i. ***Insurance Pools***

      Small water system representatives report that they are not eligible to participate in the insurance pool that serve large water systems. This raises their insurance costs. The California Association of Mutual Water Companies created a Joint Power Risk and Insurance Management Authority (California Association of Mutual Water Companies, n.d.). This is an insurance pool serving California Association of Mutual Water Companies. Later, CalMutuals offered JPRIMA member water companies that purchased both workers compensation and liability insurance access to training courses. Mutual

Water Companies under 500 connections are offered free access to training courses. This includes training for board members, system managers, and operations staff on water, wastewater disposal, and water treatment systems.

ii. Mutual Aid Agreements

In June 2020, the California Association of Mutual Water Companies made a further step towards pooling water system resources (California Association of Mutual Water Companies, 2020). They helped eight different water systems in the WRD area come together to develop and sign a mutual aid agreement. They initiated this agreement because of concerns over clean water during the COVID crisis (A. Ortega, personal communication, January 8, 2020). Two larger systems will anchor the agreement, by providing expertise to those that need it. They will all assist each other in addressing system problems. If successful and made permanent, mutual aid agreements could be a key addition to the toolkit that WRD has developed to support systems with grants, planning, permitting, and construction of key infrastructure.

1. Other Potential Ways to Pool Funds for Services

Other areas where pooling funds could be used to provide economies of scale for small systems include:

- A single fiscal agent to manage the finances for a group of systems.
- A unified water quality monitoring and reporting program.
- Shared water treatment system operators with high level certifications for improved system maintenance.
- A Grants Manager that would focus on helping small systems compete with bigger systems for competitive grants and take advantage of grant sources earmarked for DAC/SDAC systems.
- Shared technical assistance, as in the Mutual Aid agreement discussed above.
- Shared emergency services and training.

2. Are Privately Pooled Funds a Sustainable Solution for Small Water Systems?

Private trade associations may be able to provide and facilitate some services for a price that some water systems can afford. However, there are limitations to what trade associations can do to help systems pool funds together in a mutual aid agreement. First, the systems that are most likely to be in trouble are not always members of these trade associations. Second, small DAC/SDAC systems may not be able to afford pooled services fees. It is not clear that trade associations are eligible to receive State Water

Board funds to underwrite the technical assistance that they give. Researchers should review and evaluate the success of these efforts after they have been in effect long enough.

I. A Joint Powers Authority[58] (JPA) May Potentially Be an Appropriate DAC/SDAC Water System Solution in Some Counties, Especially Those Urban Counties Having Many DAC/SDAC Systems at Risk That Need Help or Consolidation

The JPA would have three purposes:

- To be a public entity that provides Administrator services to at-risk or failing DAC and SDAC water systems. This public entity would be eligible for Administrator funding under the SAFER Program.
- To be a single pooling service for-fee agency to provide small water systems with a range of services that they cannot now afford to get on their own. Lower prices might come from economies of scale when a larger entity provides the same services to many smaller entities.[59] The JPA could apply for State Water Board Technical Assistance Funding from the State Water Board to underwrite the pooling fees for DAC/SDAC water systems. Small Non-DAC water systems could opt to get services for full fee.
- To be an entity that monitors success after a consolidation in the County, learning what is working and what is not.

This is a variation on the current Administrator Program: a single countywide agency Administrator for all systems that are out of compliance or at high risk of failing. A single public entity might be more efficient in obtaining the services of skilled water managerial, fiscal, and operational experts than several Administrators working separately in different water systems.

i. Comparison of a JPA with Legislative Proposals for New Countywide Small System Authorities

There have been more sweeping legislative proposals in California to create county-level small system authorities to be a single permanent management water agency for failed DAC/SDAC systems. If, in the future, the only viable consolidators are the higher water rate IOUs, the findings in this report suggest that creating a public

[58] Joint Powers Authorities are legally created entities that allow two or more public agencies to jointly exercise common powers. Forming such entities may not only provide a creative approach to the provision of public services, but also permit public agencies with the means to provide services more efficiently and in a cost-effective manner. The Joint Exercise of Powers Act, as codified in California Government Code section 6500, governs JPAs. Under the Act, JPAs are restricted to use by public agencies only. However, the term public agency is defined very broadly. A public agency can include, but is not limited to, the federal government, the state or state departments, mutual water companies, public districts and recognized Indian tribes (BBK, 2016).

[59] This is the same concept as used for "contract" cities. In the 20th century, many new cities were forming to obtain control over development and land use in their jurisdictions. While they became independent, they contracted for services with the County for anything from sheriff and fire departments, to libraries and parks. Now there are 70 contract cities (California Contract Cities Association) in several counties. In the decades since then, there have been studies that show that combined services can yield cost savings for contract cities (Zeemering, 2018).

option for the consolidator role is a good idea. As discussed early, there are only two IOUs with rates low enough to serve acquired DAC/SDAC systems without customers having to absorb a big water rate increase.

However, in 2018, Governor Brown vetoed an effort to create county-level small water system authorities. Brown vetoed AB 2050 (Caballero) because it would cost too much and lacked a funding mechanism. A new version of that bill was reintroduced in 2019 as SB 414 (Caballero), which would create the "Small System Water Authority Act of 2019." SB 414 authorized county-level small system water authorities that will have powers to absorb, improve, and competently operate "noncompliant"[60] public water systems. The bill specified that these authorities would be eligible for SAFER funding created by SB 200 in 2019, as well as other revenues.

However, the bill has failed in its last committee hearing at the last Assembly Appropriations Committee before a final floor vote. The Committee Analyst raised concerns that there were many kinds of costs in the bill that were unfunded, or underfunded, including higher State Water Board administrative costs, unfunded costs to the CPUC, unknown State Controller costs, and unknown State-mandated cost reimbursement to the LAFCOs that would form the new agencies. While these concerns can be resolved, the financial costs were a major impediment to forward movement (SB 414, August 21, 2019).

The JPA model discussed in this report is more modest, does not require legislation, but also does not create a new freestanding agency to take over and manage small failed systems. The key differences are:

- There is a different role for a JPA, as the Administrator, to implement physical consolidations with another water system or to develop a managerial consolidations or fee for specific services. The JPA would be a third party who arranges for a consolidation with another water system where needed, working with the County LAFCO when both systems are under LAFCO jurisdiction.
- JPAS would form voluntarily, and not require mandatory cost reimbursement.
- JPAs would form by agreement of members, not by creation of a new organization by LAFCO. The functions that they undertake would also be voluntary.
- The JPA leadership could include existing countywide or regional public agencies with expertise in water regulatory compliance, water system financial management, water agency governance, and overall management and water systems technical services, headed by a Chief Administrator. The oversight board would also include representatives of the State Water Board, the

[60] Noncompliant refers to water systems that consistently do not meet water quality standards.

County lead agency, and regional water agencies who supply expertise. It could also include elected officials from the affected cities and residents from County unincorporated areas appointed by the Board of Supervisors or Board members themselves.

Of course, the first objection to this idea is that no state legislative mandate means that there is no reason for a county or anyone to volunteer to organize or participate in the JPA. It would take both State persuasion and incentives to bring together willing agencies to organize and contribute to this entity. Funds expended for this Countywide Administrator would be for the same water systems that the State Water Board would support under the current SAFER Program, and thus could be eligible for SAFER funds. Other funds could come from contributions of services by the JPA members, or from grants or appropriations from the state or federal government. There would also be revenue in the form of voluntary payments by the small systems, both DAC/SDAC and Non-DAC, for direct-pooled services that the JPA supplies. However, there would be basic overhead any organization, and that would need a funding source. If, in the end, no parties are interested in forming a JPA, the State could go back to legislating a Countywide Small Water System Authority, addressing the problems identified by the Assembly and providing the funding needed to operate an authority.

CONCLUSION

X

In this report, we illustrate the actual and potential problems of the 29 urban disadvantaged community water systems in Southern Los Angeles County within the WRD boundary. We use both the Sativa County Water District case study and available data on the other 28 DAC/SDAC systems in this area to identify some actual and potential risks to these systems. The typology of different legal types of water systems in California and in this area makes a difference in governance, oversight, and water rates. We found that the IOU operational model and governance provides the best incentives as consolidator in the region, while also allowing the provision of clean and reliable water supplies to customers. However, affordability and public ownerships issues are concerning.

A. Key Findings and Recommendations for Southern Los Angeles County DAC/SDAC Systems Strategy

IOUs are the type of water system currently most capable of becoming a consolidator and running their water systems well in the region. However, most IOUs in the WRD have significantly higher water rates. *Where IOUs now serve DAC/SDAC service areas, ratepayers pay between 22-26 percent higher rates than average in this area.* The same higher water rate IOUs are also closest to the Non-IOU DAC/SDAC water systems. So, they have the best proximity but are the least affordable. On the other hand, the two *lowest water rate IOUs have service areas with median household income or higher customers* and are further away from DAC/SDACs.

Los Angeles County's search for a consolidator for Sativa used the competitive bid process. That process resulted in the selection of one of the two lowest water rate IOUs, Suburban Water Systems. If Los Angeles County and Suburban sign an agreement that provides water rate increases that Sativa ratepayers can afford, and the CPUC upholds it, then this could be an example of a successful consolidation. However, if a DAC/SDAC water system consolidates with a much higher water rate IOU, the ratepayers would be trading a water quality or water supply problem with an affordability problem. However, the field of IOUs available to be affordable consolidators for current DAC/SDAC systems is small if needed for other DAC/SDAC systems in the future.

Given this information, the JPA concept discussed in this report may be a better solution for other DAC/SDAC systems than consolidation with a higher rate IOU. Some of the current water system owners/managers certainly prefer getting help improving their existing DAC/SDAC water systems. A JPA could focus on technical assistance and some pooled services that the DAC/SDACs cannot provide on their own. Non-DAC/SDAC systems could also be in the pool for services, paid by fee. For instance, through pooling, DAC/SDACs could share highly trained water treatment system operators to ensure higher quality management of the water treatment systems in the future.

If improving the capacity of an existing DAC/SDAC water system is the selected strategy, then physi-

cal consolidation becomes a last choice option, used when the DAC/SDAC water system governing board and managers are simply unable or unwilling to receive assistance.

If, on the other hand, many different DAC/SDAC systems are failing and cannot or are not interested in help, and if IOUs with affordable water rates cannot be consolidators, then California might reconsider a proposal similar to the Countywide Small Water System Authorities proposed in 2019 in SB 414 (Caballero).

Water system participation and public participation in the WRD DAC/SDAC Water System Risk Assessment are both essential. Community stakeholders in these water systems need to understand and comment on the Risk Assessment methodology as well as review and comment on the results.

B. WRD Risk Assessment

The WRD is a public agency with a Board of Directors elected by four million voters in five districts. The WRD is also responsible for managing the groundwater basins for all groundwater pumping rights holders. Voters do not pay taxes to fund the WRD. Revenues for the WRD come from "replenishment fees" and Watermaster fees paid by the groundwater pumping rights holders. Therefore, WRD has two sets of responsibilities: to the voters and to the groundwater pumping rights holders, most of whom are community water systems. Accomplishing both of these goals will be difficult but necessary.

C. Recommendations for Future Research

The State Water Board should consider applying the Reibel et al. approach used in this report for Los Angeles County to improve accuracy of DAC/SDAC designations in other counties. Developing countywide maps would be helpful in urban counties where there are many DAC/SDAC water systems, and where many water systems adjoin each other. This would reveal correctable errors in DAC/SDAC/Non-DAC designations and allow analysis of potential consolidation partners.

The WRD water system rates vary between $25 per 12 CCF and nearly $100 per 12 CCF in the WRD. Researchers should investigate all of the variables that produce such a big rate variation in the WRD. This report identified some variables that account for this, but more factors might play a role in water rate variation.

Future research should also focus on water rate variance among IOUs, focusing on why IOU water rates in the WRD are highest in the lowest income areas and lowest in the highest income areas. Since the same twelve Class A and B IOUs serve water across the state, an examination of other counties could determine if the WRD IOU rate relationship to median household income is the same elsewhere, or an aberration.

Water Privatization: There has been quite a bit of research in other parts of the nation and globe about how privatization affects price and service quality. The results are mixed, with some showing

positive results and more reaching negative conclusions. What is the actual tradeoff being made when a system is privatized? What is the tradeoff between higher prices and loss of local control, negative to customers on one hand, with better water service and quality, positive for customers, on the other? This would represent a next step beyond the analysis made in this report.

Primary Pollutant Exceedances: Investigate Volatile Organic Compounds as a pollutant risk for drinking water systems in Central and West Groundwater Basins. Examine why water systems in Southern Los Angeles County are financing water treatment systems to treat Volatile Organic Compounds, a primary pollutant, but there are no MCL exceedances recorded.

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APPENDIX A: COMPARISON OF 2019 AND 2020 WATER RATES FOR WATER SYSTEMS IN THE WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA

Table A-1

Comparison of Water Rates for Individual Water System Service Areas in Water Replenishment District of Southern California, 2019-2020[1]

System Name	2019 Rate	2020 Rate
TRACT 349 MUTUAL WATER CO.	N.A.	N.A.
MONTEBELLO - CITY, WATER DEPT.	N.A.	N.A.
CITY OF BELL GARDENS	N.A.	N.A.
PARAMOUNT - CITY, WATER DEPT.	$ 25.71	$ 25.71
DOWNEY - CITY, WATER DEPT.	$ 29.95	$ 30.10
BELLFLOWER HOME GARDEN WATER COMPANY	N.A.	$ 31.50
PICO WD	$ 42.01	$ 42.01
VERNON - CITY, WATER DEPT.	$ 34.70	$ 42.93
CERRITOS - CITY, WATER DEPT.	$ 31.43	$ 43.11
MONTEBELLO LAND & WATER CO.	$ 48.63	$ 44.10
TRACT 180 MUTUAL WATER CO.	$ 52.48	$ 46.48
BELLFLOWER MUNICIPAL WATER SYSTEM	$ 56.13	$ 47.48
WALNUT PARK MUTUAL WATER CO.	$ 47.80	$ 47.80
MAYWOOD MUTUAL WATER CO. #3	$ 40.50	$ 48.00
MAYWOOD MUTUAL WATER CO. #2	$ 40.86	$ 48.36
LYNWOOD PARK MUTUAL WATER CO.	$ 48.60	$ 48.60
BELLFLOWER - SOMERSET MWC	$ 44.35	$ 49.04
SANTA FE SPRINGS - CITY, WATER DEPT.	$ 50.44	$ 50.44
EL SEGUNDO-CITY, WATER DEPT.	$ 49.96	$ 50.53
SIGNAL HILL - CITY, WATER DEPT.	$ 45.77	$ 52.58
LAKEWOOD - CITY, WATER DEPT.	$ 43.85	$ 53.16
TORRANCE-CITY, WATER DEPT.	$ 55.02	$ 56.79
PICO RIVERA - CITY, WATER DEPT.	$ 57.15	$ 57.17
LONG BEACH - CITY, WATER DEPT.	$ 53.49	$ 59.58
SUBURBAN WATER SYSTEMS - LA MIRADA	$ 58.44	$ 61.39

[1] Rate calculated by volume of 1200 Cubic Feet (12 CCF) water use per month.

SUBURBAN WATER SYSTEMS - WHITTIER	$ 58.44	$ 61.39
WHITTIER - CITY, WATER DEPT.	$ 64.23	$ 62.24
SOUTH MONTEBELLO IRRIGATION DIST.	$ 63.22	$ 62.35
MAYWOOD MUTUAL WATER CO.#1	$ 60.90	$ 62.78
INGLEWOOD - CITY, WATER DEPT.	N.A.	$ 63.99
LA HABRA HEIGHTS CWD	$ 60.28	$ 64.81
CALIFORNIA WATER SERVICE - HAWTHORNE LEASE	$ 68.50	$ 65.74
CALIFORNIA WATER SERVICE CO. - DOMINGUEZ	$ 68.66	$ 67.12
SATIVA - L.A. CWD	$ 67.84	$ 67.84
CALIFORNIA WATER SERVICE CO. - HERM/REDO	$ 68.66	$ 68.06
ORCHARD DALE WATER DISTRICT	$ 63.28	$ 69.78
SAN GABRIEL VALLEY WATER CO. - EL MONTE	$ 68.30	$ 70.21
COMMERCE - CITY, WATER DEPT.	$ 73.09	$ 73.09
SOUTH GATE - CITY, WATER DEPT.	$ 73.88	$ 73.88
LYNWOOD - CITY, WATER DEPT.	$ 76.35	$ 76.35
CALIFORNIA WATER SERVICE CO. - ELA	$ 77.21	$ 78.03
GSWC - SOUTHWEST	$ 82.40	$ 78.44
GSWC - SOUTHWEST	$ 82.40	$ 78.44
CAL/AM WATER COMPANY - BALDWIN HILLS	$ 71.89	$ 79.04
MANHATTAN BEACH-CITY, WATER DEPT.	$ 79.64	$ 79.64
GSWC - WILLOWBROOK	$ 82.40	$ 81.47
GSWC - HOLLYDALE	$ 82.40	$ 81.47
GSWC - BELL, BELL GARDENS	$ 82.40	$ 81.47
GSWC - NORWALK	$ 82.40	$ 81.47
GSWC - FLORENCE/GRAHAM	$ 82.40	$ 81.47
LOMITA - CITY, WATER DEPT.	$ 76.81	$ 82.94
COMPTON - CITY, WATER DEPT.	$ 83.75	$ 83.75
NORWALK - CITY, WATER DEPT.	$ 76.15	$ 85.92
CALIFORNIA WATER SERVICE CO. - PALOS VER	$ 68.66	$ 86.73
LIBERTY UTILITIES - LYNWOOD	$ 102.74	$ 91.07
LIBERTY UTILITIES - COMPTON	$ 102.74	$ 91.07
LIBERTY UTILITIES - BELLFLOWER-NORWALK	$ 102.74	$ 91.08
HUNTINGTON PARK - CITY, WATER DEPT.	$ 93.28	$ 93.28

Table A-2

2019-2020 Increases and Decreases in Water Rates in Water System Service Areas by Type of Water System

2019- 2020 Average Increase Comparison by Type of System		
Systems with both 2019 - 2020 Rates	53	
System Type	Number of Systems	Average Change 2019-2020
IOU	19	0%
Mutual	8	4%
Public	23	5%
County & Special District	3	5%
WRD Total	53	3%