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CENTER FOR REGIONAL CHANGE

The Struggle for Water Justice in California's San Joaquin Valley: A Focus on Disadvantaged Unincorporated Communities

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WATER FOUNDATION

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Letter from the Director of the Center for Regional Change

Dear Colleagues,

We are honored to offer you this report, *The Struggle for Water Justice in California's San Joaquin Valley: A Focus on Disadvantaged Unincorporated Communities*. This research was commissioned by Resources Legacy Fund and the Water Foundation. It reflects their goal of improving the public health and well-being of California's most vulnerable communities, by informing the work of policymakers, public agencies and community advocates.

In 2012, Governor Jerry Brown signed a bill making California the first state in the country to recognize the Human Right to Water. Assembly Bill 685 stated that "every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes." As this report makes clear, this vision has yet to be realized for all Californians. While many of the state's residents take their right to water for granted, residents of the state's Disadvantaged Unincorporated Communities (DUCs) face ongoing hardships in gaining access to a clean and safe water supply.

The San Joaquin Valley is a powerful case in point. Here, in California's agricultural heartland, tens of thousands of people living in DUCs are regularly forced to rely on drinking water that is unsafe, dirty, and inaccessible. The story of why and how these communities came to lack a clean water supply in the past marks an important chapter in California's history, one that demands our collective attention. So, too, do the strategies for addressing this problem in the present. Responding to the pressing public health needs of the valley's underserved residents, is, I believe, a project that can and should engage the attention of all Californians. Indeed, we hope that the strategies we propose to improve water services in these communities will help inspire solutions throughout the state.

This report is the fruit of an active collaboration between university researchers, community organizations, and philanthropic partners. Bringing together these many forms of expertise has helped strengthen our analysis, increasing the report's range, depth and practical relevance. This type of collaborative, solution-oriented research is a hallmark of our approach at the UC Davis Center for Regional Change. We invite you to learn more about our work, by visiting our website at https://regionalchange.ucdavis.edu/.

Achieving water justice is a major challenge. But it is crucial to achieving our state's promise of health and prosperity for all. We sincerely hope that this report, delivered into the hands of dedicated elected officials, public agencies, and advocates, will help Californians move closer to that goal.

Sincerely,

Jonathan K. London, Ph.D.
Associate Professor, Department of Human Ecology
Faculty Director, UC Davis Center for Regional Change
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Report Partners

The UC Davis Center for Regional Change is a catalyst for innovative, collaborative, and action-oriented research. It brings together faculty and students from different disciplines, and builds bridges between university, policy, advocacy, business, philanthropy and other sectors. The CRC's goal is to support the building of healthy, equitable, prosperous, and sustainable regions in California and beyond. To learn more: https://regionalchange.ucdavis.edu

This project was made possible with generous funding from the Water Foundation and Resources Legacy Fund. It benefited from an active partnership with water justice organizations that provided crucial knowledge about on-the-ground conditions in Disadvantaged Unincorporated Communities (DUCs) and helped formulate policy and public funding recommendations. We would also like to thank Krystyna von Henneberg, Ph.D., of Creative Language Works, for her editorial assistance with this project and Jason Mendez at Snap Shot Media for his skillful graphic design.

Aoki Water Justice Clinic, UC Davis School of Law	The Aoki Water Justice Clinic at the UC Davis School of Law combines student training in transactional law, policy advocacy, and strategic research to ensure that low-income California communities receive clean, safe, and affordable drinking water. The Water Justice Clinic also offers community trainings, and develops templates and guides for community advocates. To learn more, see: https://law.ucdavis.edu/clinics/water-justice-clinic.html.
California Rural Legal Assistance Foundation	CRLAF is a statewide non-profit civil legal aid organization providing free legal services and policy advocacy for California's rural poor. It focuses on some of the most marginalized communities: the unrepresented, the unorganized and the undocumented. and engages in community education and outreach, impact litigation, legislative and administrative advocacy, and public policy leadership at the state and local level. To learn more: https://www.crlaf.org/.
Clean Water Action	Clean Water Action is a national environmental organization that organizes strong grassroots groups and coalitions, and campaigns to elect environmental candidates to solve environmental and community issues. To learn more: http://www.cleanwateraction.org/about/who-we-are.
Community Water Center	The Community Water Center develops and supports community-driven solutions to provide assistance to disadvantaged communities in obtaining clean and affordable drinking water. The CWC aims to empower, and advocate alongside, community residents to push for water boards to clean up contaminated water, provide funding for new wells, issue compliance orders making mandatory the delivery of a year-round supply of potable water to residents, and instate language-access policies that would allow Spanish-speaking residents to participate in their local board meetings. To learn more: http://www.communitywatercenter.org/.
Environmental Justice Coalition for Water	EJCW is a statewide coalition of grassroots groups and intermediary organizations building a collective, community-based movement for democratic water allocation, management, and policy development in California. The EJCW empowers low-income communities and people of color throughout California to advocate for clean, safe, and affordable water for their communities. To learn more: https://ejcw.org/.
Leadership Counsel for Justice and Accountability	The Leadership Counsel for Justice and Accountability works alongside the most impacted communities to advocate for sound policy, eradicate injustice, and secure equal access to opportunity regardless of wealth, race, income, and place. Its members influence land use and transportation planning, shift public investment priorities, guide environmental policy, and promote the provision of basic infrastructure and services through community organizing, research, legal representation, and policy advocacy. To learn more: http://www.leadershipcounsel.org/.
PolicyLink	PolicyLink is a national research and action institute aimed at advancing racial and economic equity by Lifting Up What Works. PolicyLink connects the work of people on the ground to the creation of sustainable communities of opportunity that allow everyone to participate and prosper. To learn more: http://www.policylink.org/about.

List of Abbreviations Used

AB	Assembly Bill
CalEPA	California Environmental Protection Agency
CALAFCO	California Association Local Agency Formation Commissions
CPUC	California Public Utilities Commission
CWS	Community Water System
DAC	Disadvantaged Community
DEH	(County) Department of Environmental Health
DUC	Disadvantaged Unincorporated Community
DWR	(California) Department of Water Resources
ESA	Extraterritorial Service Agreement
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
HRTW	Human Right To Water
IC	Incorporated Community
LAFCO	Local Agency Formation Commission
LPA	Local Primacy Agency
MCL	Maximum Contaminant Level
MHI	Median Household Income
MWC	Mutual Water Company
OEHHA	Office of Environmental Health Hazard Assessment
O&M	Operations and Maintenance
Prop	Proposition
PWS	Public Water System
SB	Senate Bill
SC	service connection
SDAC	Severely Disadvantaged Community
SDWA	Safe Drinking Water Act
SGMA	Sustainable Groundwater Management Act
SOI	Sphere of Influence
SRF	(Drinking Water) State Revolving Fund
SSWS	State Small Water System
SWRCB	California State Water Resources Control Board
TMF	Technical, Managerial, and Financial (capacity)
U.S. EPA	United States Environmental Protection Agency
UC	Unincorporated Community
UC	University of California [e.g. UC Davis]
USGS	United States Geological Survey

Glossary of Water System Terminology

Service Connection (SC): "the point of connection between the customer's piping or constructed conveyance, and the water system's meter, service pipe, or constructed conveyance." (SWRCB 2018, 79) This variable is the basis for CWS size.

Community Water System (CWS): "a public water system that serves at least 15 service connections used by yearlong residents or regularly serves at least 25 year-long residents of the area served by the system." (SWRCB 2018, 78) CWS Sizes: Small: < 200 SC; Intermediate 200- 999 SC; Medium 1,000 - 2,299 SC; Large 2,300- 9,999 SC; Very Large > 10,000+ SC.

State Small Water Systems (SSWS): provide piped water to the public for human consumption that has at least five but no more than 14 service connections. They are not legally considered to be a public water system due to system and population size. A SSWS "does not regularly serve drinking water to more than an average of 25 individuals daily for more than 60 days out of the year" (SWRCB 2018a, 79).

For more information on how water systems are classified, see the SWRCB's decision tree for water system classification (SWRCB 2017d).

Local Primacy Agency: aa County Department of Environmental Health (DEH) becomes a Local Primacy Agency (LPA) when a local health officer applies for and receives primacy delegation from the state. LPAs have primary responsibility for the administration and enforcement of the Safe Drinking Water Act (SDWA) for small systems (<200 SC).

SDWA Compliance Status: This study considers CWSs to be delivering safe drinking water if they are either "in compliance" or "returned to compliance" with the Safe Drinking Water Act (SDWA) as of November 2017. (SWRCB 2017l)

- "In Compliance:" CWS is achieving compliance with the federal primary drinking water standards
- "Returned to Compliance:" CWS has returned to compliance since January 1, 2012, and now meets federal primary drinking water standards (but did not in the recent past).
- "Out of Compliance:" CWS is currently in violation of one or more federal primary drinking water standard.

Ownership Type: This study categorizes water system ownership as either public or private, and also examines a small number of systems with either unknown or mixed ownership (US EPA 2009).

- "Publicly owned:" can be owned and operated by a government or public agency, or owned by a public agency and operated by a private contractor. Examples include: municipal (city-owned), state, and federally-run systems; systems run as public enterprise funds; and special districts i.e. county service areas; community services districts; and irrigation districts.
- "Privately owned:" can be both operated for profit as a water business, or as a non-profit, e.g. by homeowners' associations and non-profit cooperatives. Privately owned systems are often operated as a necessary part of another business, e.g. mobile home parks.

I. INTRODUCTION

A. Overview

In California, lack of access to clean, safe, and affordable water is a threat to public health and well-being, and violates the state's newly codified Human Right to Water (HRTW). In low-income communities located outside city boundaries (otherwise known as disadvantaged unincorporated communities or DUCs), drinking water is often unsafe to drink. In many such localities, drinking water is contaminated by industrial by-products (usually associated with agriculture, oil and gas production, transportation, and manufacturing) and compromised by inadequate wastewater treatment and disposal systems, as well as naturally occurring toxic substances like arsenic and uranium. Many DUC residents in the San Joaquin Valley pay a triple penalty to obtain safe water: they bear the health costs of unsafe drinking water; they purchase that unsafe water at high costs; and they must also purchase "substitute" water—typically expensive bottled water—for drinking and cooking purposes.

Lack of access to clean, safe and affordable drinking water has a racial and ethnic component: the vast majority of the valley's DUC residents are people of color who also face cumulative impacts from environmental contamination brought on by proximity to air pollution, pesticides, toxic facilities and waste disposal. Without city governments to directly represent their interests and provide essential services, residents of these DUCs have been systematically deprived of access to important means of democratic governance (Anderson 2008).

California's San Joaquin Valley is the source of much of the state and the nation's agricultural wealth. Yet it is also a region where poverty persists amidst prosperity (Taylor and Martin 1998). Many of the region's DUC residents hold low-wage and dangerous jobs, and confront severe and cumulative environmental contamination of their air, water, and land (London, Huang, Zagofsky 2011). The well-being of the nearly 350,000 residents living in 450 DUCs throughout San Joaquin Valley is therefore an important environmental health, and social justice issue that demands urgent attention by policy makers, public agencies and advocates.

Over the past two decades, community leaders, advocates, and policymakers have pursued a range of strategies to address unsafe drinking water in the valley's DUCs and elsewhere in California. For example, in 2004, resident advocates won a case against the City of Modesto in 2003 for its systematic exclusion from city services of communities of color living in nearby DUCs (Molina 2014). In 2011, Senate Bill (SB) 244 required cities and counties to address the infrastructure needs of California DUCs in land use and municipal service plans, and in annexation decisions. In 2012, an HRTW policy was passed in response to massive community mobilization. Known as Assembly Bill (AB) 685, and signed by Governor Jerry Brown, it codified that every human being has a right to safe, clean, affordable, and accessible water to meet basic human needs, and required state agencies to consider this right when establishing policies and regulations.

A 2013 report by the Community Equity Initiative (led by PolicyLink, California Rural Legal Assistance Inc., and California Rural Legal Assistance Foundation) developed a sophisticated analysis of the conditions of DUCs in the San Joaquin Valley. *California Unincorporated: Mapping Disadvantaged Communities in the San Joaquin Valley* (Flegal et al. 2013) put DUCs on the map by using a new methodology to identify these communities, and to highlight the need for new policies and funding mechanisms to address the significant challenges they face. This report, and the dedicated work of water justice advocates, have greatly increased public awareness of water inequality in DUCs. This has helped direct new public funding to improve water infrastructure, and encouraged collaborative solutions among interest groups that historically have been in conflict with each other. However, all parties agree that much more needs to be done to understand the complex issues facing DUCs, and to provide their residents with safe and affordable drinking water.

Our report analyzes this situation in detail, and offers several recommendations to inform policy and advocacy on how to improve water access to these communities. To do so, we have used maps of DUCs, CWSs, and State Small Water Systems (SSWSs),[1] as well as water quality reports, demographic data, and expert interviews. Together, these sources have helped us highlight gaps in the provision of safe and affordable drinking water. Our main conclusion is that California's legislature, regulatory agencies, and water suppliers need to undertake more concerted and well-resourced efforts to ensure that the HRTW is ensured for all of the San Joaquin Valley's residents.

B. Disadvantaged Unincorporated Communities: Placing the San Joaquin Valley in Context

While this study focuses on California's San Joaquin Valley, it is important to understand that water and other related inequities faced by DUCs reflect conditions across the state and nation. In California and other states, the majority of residents receive their drinking water from community water systems that deliver clean drinking water. This may contribute to the widely-held misconception that lack of access to water is exclusively a problem in poor, developing countries. However, the reality is very different. Millions of families in the United States live in unincorporated communities in economically marginal areas that face drinking water challenges (Anderson 2008). Indeed, many journalists, scholars, and activists engaged in fighting water injustice in the U.S. describe affected communities as 'Third World areas in a First World country' (U.S. Congress 1990; Ortiz 2004; Marsh et al. 2010; Anderson 2008).

Research in the field of environmental, urban and legal studies, as well as geography and public policy, confirms that many DUCs lack potable water as well as other basic infrastructure. In urban and peri-urban areas, municipal 'underbounding', or the use of selective annexation, excludes DUCs from investment in basic infrastructure, as well as democratic representation. Scholars describe this as an insidious form of exclusionary land use planning that has effectively replaced the explicit racial zoning laws inherited from the 1960s (Hagman 1976; Marsh et al. 2010). Geographers characterize this process as a type of gerrymandering, historically used by small cities and towns, especially in the American South, to avoid annexing black communities, reducing their voting power and denying them municipal services (Aiken 1987; Lichter 2007).

Scholarship regarding patterns of poverty, incorporation, and exclusion from water infrastructure in the western U.S. often focuses on communities known as *colonias* located along the U.S.-Mexican border. Tension exists surrounding the use of the term *colonias*. In the United States, the term was once used to evoke Mexican or Spanish cultural heritage and pride. However, it has since taken on a pejorative meaning, and is often used to denote unregulated housing subdivisions in the Southwest that are largely populated by Mexican immigrants and that lack sufficient infrastructure (Anderson 2008). Since the passage of the Cranston-Gonzales National Affordable Housing Act of 1990, the federal government has designated certain areas as *colonias* in Texas, New Mexico, Arizona, and California, and has made funding available to these communities through the Departments of Agriculture, and of Housing and Urban Development, as well as the Environmental Protection Agency (Mukhija and Monkkonen 2007).

Studies of these communities continue to reveal a widespread lack of water and sanitation (Durst 2014). What is more, water rate regulation, which was intended to make water service affordable, often represents an additional barrier to service coverage in poor, unincorporated communities (Olmstead 20014). Other factors may also play a role in reinforcing these negative outcomes. Within these communities, immigration status is the strongest predictor of water insecurity: mixed-status households that include documented and undocumented residents are the most vulnerable to these conditions (Jepson and Vandewalle 2015).

What role do race and ethnicity play in these patterns of exclusion? Many scholars argue that selective annexation tends to be racially motivated (Aiken 1987; Lichter 2007, Anderson 2008). However, with a few important exceptions, discrimination, has been difficult to prove in court. Recent changes in civil rights law enforcement (e.g., following Alexander v. Sandoval 532 U.S. 275 [2001]) require evidence of intentional racial discrimination as opposed to evidence that merely demonstrates a racially disparate impact. Indeed, cities often cite the financial burden of annexing poor communities as a rationale for selective incorporation (Romney 2005; Mukhija and Mason 2013; Molina 2014), making intentional discrimination hard to prove. Despite these hurdles, advocates have achieved some notable successes. For example, as noted above, in 2003, the Ninth Circuit Court found sufficient evidence of discriminatory impact in the selective annexation practices of the City of Modesto, California, compelling the city to provide municipal services to neighborhoods outside the city boundaries, which were which were inhabited primarily by inhabited by a majority of low-income people and people of color (Molina 2014).

II. THE HISTORICAL ROOTS OF DISADVANTAGE AND UNINCORPORATION

A. Background

The current disparities affecting residents of DUCs in the San Joaquin Valley and elsewhere in California are deeply rooted in political, economic, and social dynamics. DUCs have been shaped by hundreds of years of exploitation of human labor and natural resources, racist actions, institutions and ideologies, and California's problematic system of public finance and land use regulation.

Euro-American settlement in the San Joaquin Valley began with the provision of massive Spanish and Mexican land grants and the genocide of Native peoples under Spain, Mexico and the United States. Starting in the early 1800s and accelerating in the decades after California attained U.S. statehood in 1850, the political economy of the region was shaped by land speculation and ownership consolidation, the construction of the Southern Pacific Railroad, oil and gas extraction, and intensive agricultural development. Land consolidators established many of holdings through manipulating of federal and state land settlement and irrigation policies (Goldschmidt 1947; Walker 2004). Eissinger (2015) describes the turn-of-the-century "California Colonization Project" as marked by a large and diverse migration into the area, as farmers and farmworkers, lured by the promise of fertile soils, favorable weather, and abundant (and publicly-subsidized) irrigation, sought to supply the state's growing population with agricultural products.

Generations of immigrants from Mexico, the Philippines, India, Pakistan, Yemen and other countries, African Americans from the Jim Crow South, as well as low-income white people (including the "Dust Bowl refugees" portrayed in John Steinbeck's 1939 novel *The Grapes of Wrath*) from small towns across the United States settled in the San Joaquin Valley throughout the 1900s. Here they were excluded from many urban areas through racially-restrictive housing, economic redlining, as well as threatened and actual racial violence.

In the decades following World War II, urban development patterns that prioritized established urban areas inhabited by wealthier and white populations starved peripheral and rural neighborhoods of investment. Many cities grew in a way that excluded neighborhoods inhabited by lower-income people and people of color from incorporation, and the provision of municipal services. Few of these communities had the economic resources or political clout to form municipal governments; in many cases, did not meet the legal criteria for incorporation.

In the 1960s, California formalized these urban-centric priorities and with them, the inequities they encouraged. City and county general plans from the late 1960s and early 1970s present a pattern of underinvestment and exclusion through funding priorities and land-use designations that discouraged development in low-income unincorporated communities in favor of existing urban areas, while protecting prime agricultural lands from

urban encroachment. Since the 1960s and continuing today, many cities and counties adopted an urban/suburban sprawl growth model with residential and commercial development at the urban fringe (Bradshaw and Muller 1988; Lubell and Handy 2009; Sokolow 2003). Many cities engaged in 'leap frog' annexation and development policies that purposefully excluded DUCs inhabited by lower-income people and people of color, depriving them of municipal services. In many cases, city and county funding for disadvantaged and unincorporated communities inhabited by low-income people and people of color is limited, leaving them to depend on competitive, and therefore unreliable, state and federal funding.

These patterns have played out in distinctive ways in the Northern, Central and Southern sub-regions of the San Joaquin Valley. In the sections that follow, we examine each one of these sub-regions and their constituent counties to understand the interplay between urban and rural growth, and how the priorities of urban planners led to underinvestment in many of the region's DUCs.

B. The Northern San Joaquin Valley (San Joaquin, Stanislaus, and Merced Counties)

The Housing Element of the General Plan for San Joaquin County (1970) positioned urban centers as the basis for the county's future development. The plan set forth the principle that residential planning in all incorporated and unincorporated communities would follow a structure of "communities" made up of three to five 3,000-5,000-person "neighborhoods" as the focal element around which public investments in services and facilities should revolve (San Joaquin County 1970, 17-18). Given this structure, public services would be provided and maintained only in areas projected to accommodate an adequate tax base. As a result, plans directed residential growth into existing urban centers instead of unincorporated places with low-income populations. From the perspective of county planners, residential development in unincorporated county areas was not appropriate for public investment because it required the costly expansion of municipal service into places with few residents with limited ability to pay for utility rate increases.

San Joaquin County's 1970 General Plan discouraged development in small residential areas in "islands" or "pockets" within cities or on the fringe of city boundaries. Planners noted, "if retained in residential use, each pocket will be kept as large as possible to form its own environment" (San Joaquin County 1970, 17-18). Maps of the city of Stockton (the county seat of San Joaquin County) from the period from 1990-2002 created by the Farmland Mapping and Monitoring Program of the California Department of Conservation illustrate a pattern of urban development that excludes unincorporated areas inhabited by low-income residents to the south of the city in favor of new residential expansion in the northern part of the city (American Farmland Trust 2006).

The 1980 Housing Element of the San Joaquin County General Plan offers more details about development in unincorporated county areas. Here county planners acknowledged their inability to provide basic services to all unincorporated communities "even under the most favorable federal matching formulas for aid" (San Joaquin County 1980, 50). The General Plan specified first, that "in urban centers without municipal sewer and water, a community design plan will be required prior to residential expansion;" and second, that "further expansion of rural centers, until such time as they have municipal sewer and water, should not be encouraged" (San Joaquin County 1980, 50). Although the needs of unincorporated county areas were considered, actual public investment in them was limited.

C. The Central San Joaquin Valley (Madera, Fresno, and Kings Counties)

The Housing Element of the Madera County General Plan (1969) prioritized the development of metropolitan areas, along with the elimination of DUCs, or what it called "rural slums." To steer new development into areas adjoining existing urban places, county planners embraced what they deemed a "Bull's-Eye" Concept. This framework promoted residential growth in urban cores through public bonding methods to help finance

the development of essential public facilities like sewer and water systems (Madera County 1969, Housing Element). Madera County planners proposed that urban development be discouraged outside existing towns and communities "except where such development includes all facilities of such a town or community, including public sewer and water systems and adequate drainage, recreation, and roadway facilities" (Madera County 1969, Implementation Section). The Bull's Eye approach sought to identify economically viable locations for new development where infrastructure was already installed, thus offsetting the cost of municipal expansion for the county and for private developers. This approach marginalized unincorporated communities that lacked infrastructure as development in these places was deemed too costly and at odds with the objective of restricting growth in rural areas. The responsibility to provide drainage, sewer, and water services for unincorporated communities in the outlying portions of the county was passed off to state and federal funding sources.

The 1995 Madera County General Plan recognized the failure of policies to direct population growth solely toward the county's two incorporated cities (Madera and Chowchilla), as the rate of growth in unincorporated areas surpassed that of cities (Madera County 1995). Nevertheless, the 1995 General Plan retained the objectives of its 1969 predecessor, namely, "to guide and direct development of urban land uses into urban areas of the county and to discourage or guide these urban land uses away from agricultural uses" (Madera County 1995). In the County Land Use Element, the unincorporated community of Oakhurst was the only rural community projected to undergo the installation of water and sewer systems, while residents of other DUCs were expected to continue using private and unregulated wells. In the case of the community in Fairmead, in Madera County, Eissinger (2012) argues that its ongoing dependence on groundwater is perhaps the most important factor arresting rural development into the present. The 1995 General Plan made no provisions for providing drinking water and other necessary infrastructure to small DUCs in the county, including La Vina, Parksdale, and Parkswood.

D. The Southern San Joaquin Valley (Tulare and Kern Counties)

Kern County's 1972 Housing Element of its General Plan states that, given the limited tax base prevalent in low-income unincorporated areas, public services like sewer and water facilities in those areas could not be financed through local resources. "These facilities," the plan stated, "must be financed at least to a major extent by Federal grant programs," adding that "these programs, of course, are limited by the monies Congress will approve for this purpose" (Kern County 1972a). Kern County's planners also described unincorporated communities as threats to the county's agricultural base. Kern County's Open Space Element of its 1972 General Plan states that:

> urban development should be provided for; however, this should be rationally planned, normal expansion of existing areas, occurring only when necessary, and in other areas when a proven need exists and such use is compatible with the adopted General Plan. (Kern County 1972b, 15)

Pannu (2012) writes that unincorporated communities in Tulare County's 1971 General Plan were understood primarily as a drain on county services. She argues that the county's strategy of withholding public services such as water and sewer from communities that were deemed as "non-viable" functioned to "starve out" its fifteen unincorporated communities (Pannu 2012). Tulare County's 1972 Environmental Resources Management Element of its General Plan establishes the primacy of preserving agricultural land in the county. The planners emphasize that:

> urban development, within established spheres of influence of municipalities and around the periphery of other growth centers in the county, should proceed in orderly fashion, with coordinated extension of utility services and avoidance of fragmented urban growth extension in order to attain maximum conservation of usable agricultural acreages. (Tulare County 1971)

These policies were ostensibly intended to protect agriculture. However, between 1990-2000, for example, 33% of all development in Kern County was on High Quality Farmland (American Farmland Trust, 2013) thus demonstrating the limits of this land protection policy. Meanwhile, existing DUCs on the periphery of the cities suffered for want of investment. Over the last fifty years, DUCs have been caught in the crosshairs of, on the one hand, agricultural protection policies that limit investment in rural communities, and, on the other, urban development policies that encourage sprawl in new and exclusive suburbs. This is the development pattern that produces and reproduces disadvantage in unincorporated communities.

III. SAN JOAQUIN VALLEY DRINKING WATER SYSTEMS: SMALL, FRAGMENTED, AND FRAGILE

For residents of the SJV, a patchwork of small water systems, often with inadequate physical and operational infrastructure, results in uneven access to safe drinking water. The SJV counts 667 active Community Water Systems (CWSs) of varying sizes and ownership types, most of which predominantly rely on groundwater. The diversity of these systems, and the fragmented ways they are regulated, makes it difficult to ensure an adequate supply of water of suitable quality. This section provides an overview of the drinking water conditions in the region as a whole, while the following sections focus especially on the region's DUCs.

Size and Ownership

The majority of the SJV's community water systems are small, with fewer than 200 service connections. Over half the CWSs in the region are privately owned (58%) and 54% are both small and privately owned. Common examples of small, privately owned CWSs in the region are those that are owned and operated by mutual water companies (MWCs) or mobile home parks. Households in the SJV that are not served by either a CWS or SWSS rely on private, domestic wells. The spatial distribution and density of private wells across the state and the SJV is not well documented. Honeycutt et al. (2012) estimated that in the Tulare Lake groundwater basin (which includes parts of Fresno, Kings, Kern, and Tulare counties), 245,490 people relied on 74,400 private domestic wells for drinking water. Using spatial analysis results from Johnson and Belitz (2015), it is estimated that there are at least 71,700 domestic wells supplying more than 141,000 households in the SJV.

Water Quality Regulation

The SWRCB's Division of Drinking Water regulates CWS and ensures that drinking water meets state and federal quality standards, with some exceptions. In four SJV counties (Kings, Madera, San Joaquin, and Stanislaus) the SWRCB delegates authority to the Departments of Environmental Health (DEHs), which serve as Local Primary Agencies (LPAs) for small systems (< 200 SC) and jointly enforce the Safe Drinking Water Act (SDWA) on the 498 small water systems in their counties. Additionally, the California Public Utilities Commission (CPUC) shares water quality regulatory authority with the SWRCB for 37 privately-owned systems in the SJV (the majority of which are small systems with less than 200 connections).

In the SJV, there are 231 SSWSs: these have less rigorous operational requirements than those applied to CWSs. SSWSs are overseen by DEHs in all counties, not just those with local primacy. There is no state program or requirement for water quality testing from SSWSs, Local Small Water Systems, or domestic wells. Where water quality data is collected, it is done at the county level, with each county setting its own set of requirements.

A 2014 report to the California Governor's Office (California Governor's Drinking Water Stakeholder Group [CGDWSG] 2014) summarized the testing requirements in Tulare Lake Basin counties, as follows:

1. For SSWSs, nitrate testing: "may occur only upon the initial permitting" (Kern County); annually (Fresno and Tulare Counties); or on a different schedule, depending on concentration levels (Kings County).
2. For Local Small Water Systems (2-4 service connections), nitrate testing is either: not required (Tulare, Fresno, and Kings Counties); or is required only at well initial permitting (Kern County).

The report further states that while county data may be shared with the state, these data are not linked to well completion reports and are not maintained in a way that aligns with existing state databases. For domestic well water quality, the data is inconsistent and not available region-wide (CGDWSG 2014).

Groundwater contamination

The SJV has some of the most contaminated aquifers in the country (Moore et al. 2011). This is an especially acute problem, given that 87% of the 667 CWSs in the SJV are reliant on groundwater (SWRCB 2017e). Using water quality data from 1999-2001, researchers found that many small community systems serving high percentages of Latinos were delivering water with high nitrate levels (Balazs et al. 2011). A 2012 Tulare Lake Basin nitrate study warned that the nitrate problem was likely to worsen for decades to come (Harter et al. 2012).

The presence of arsenic is another major public health and equity issue. A study using 2005-2007 water quality data reported that water systems serving predominantly socio-economically disadvantaged communities in the SJV had higher odds of having an arsenic Maximum Contaminant Level (MCL) violation, compared to water systems serving communities of higher socio-economic status (Balazs et al. 2012). In 2006, the SWRCB tested 181 domestic wells in Tulare County and found that 40% of them had nitrate levels above the legal limit of 10 mg/L, while 33% tested positive for unsafe levels of total coliform (SWRCB 2016a). A 2010 U.S. Geological Survey (USGS) study found that up to 7% of the domestic wells sampled had nitrate levels above the legal limit (SWRCB 2017i).

Approximately one third of the state's out-of-compliance water systems are located in the SJV (SWRCB 2017) and 20% of the region's CWSs are out of compliance (SWRCB 2017l).[2] Approximately 23% of CWSs in the valley are out of compliance. This compares unfavorably to the proportion of intermediate and large-sized systems that are out of compliance (15% and 11% respectively).[3] This not surprising, given other research that found strong correlations between small systems, and nitrate and arsenic violations (Moore et al. 2011; Balazs et al. 2011; Balazs et al. 2012). As of November 2017, 22% of privately owned and 19% of publicly owned systems remain out of compliance. This shows that ownership type alone is not a determining factor in whether a system is in violation of drinking water standards.

Valley-wide, 75% of the 139 out-of-compliance CWSs primarily rely on groundwater. Tulare and Kern counties are two of the top three counties with the most active and standby public wells with nitrate concentrations above the MCL, with 95 wells in Tulare and 88 in Kern (SWRCB, 2017i). Kern also topped the list for the most wells (155) with arsenic above the MCL in the state (SWRCB 2017h). In July 2017, the SWRCB established a state MCL for 123 Trichloropropane (TCP). The two counties with the highest number of wells with detections above the state MCL were Kern and Fresno, with 110 and 64 wells respectively (SWRCB 2017g). In the 2015 Safe Drinking Water Plan, the SWRCB suggested that it was open to expanding the plan's scope to include domestic wells SSWSs, with the caveat that it needed improved data, and "new and expanded authority, significantly more resources, as well as commitment and involvement of other local and state agency partners" (SWRCB 2015, 16).

IV. FINDINGS

In order to better understand and visualize the fragmented patchwork of small and often underperforming water systems, and to learn more about SJV DUCs' inequitable access to clean water, the UC Davis Center for Regional Change undertook a spatial analysis. This analysis builds on existing maps of DUCs by adding information on water infrastructure and quality. Using several different data sets, we determined: a) whether DUC boundaries are overlapped by a CWS boundary, b) the quality of the drinking water of CWSs overlapping these DUCs, based on the CWSs' compliance with the SDWA; and c) the least-cost paths from these DUCs to nearby CWSs (See Appendices for information our methodology).

Two critical data sets for the spatial analysis are provided by the DUC and CWS boundaries. The CRC used the DUC dataset developed by PolicyLink and its partners, and updated in 2013, as the basis for this analysis (Flegal et al. 2013). The CRC obtained CWS boundary data for 667 SJV systems from the Office of Environmental Health Hazard Assessment (OEHHA) in December 2017.

A CWS's boundary represents its service area, and this analysis assumes that households found within the service area are served by that CWS, or at least a fraction of households in each partially intersected DUC receive water from the intersecting CWS.[4] County-provided SSWS data includes data for 231 SSWSs in the SJV region, for which the authors have approximate locations for 197.[5] These locations are indicated on the maps, as data permits.

A. DUC Residents Have Uneven Access to Community Water Systems

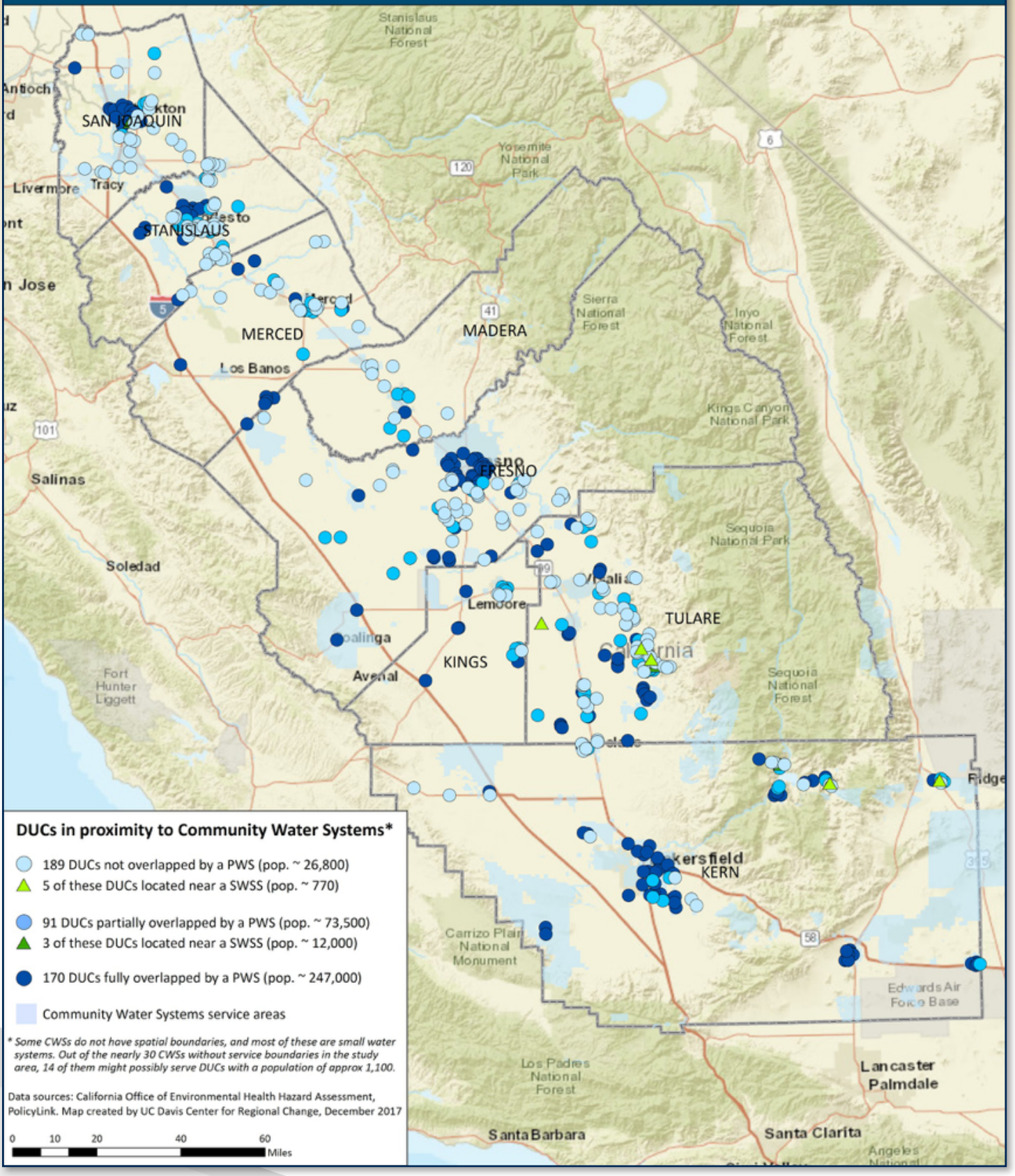
Our spatial analysis indicates that DUC residents are served by a fragmented patchwork of small and often underperforming water systems that result in uneven access to safe drinking water. This patchwork of sizes and types of systems requires a range of specific solutions to fit the diverse circumstances facing these DUCs.

Maps 1 and Maps 1a-1c, as well as Table 1, below, show that the vast majority 247,000 (71%) of the 347,300 DUC residents in 170 DUCs in the SJV live within a CWS service area boundary. Another 73,500 residents live in 91 DUCs that are partially intersected by a CWS, while an additional 770 DUC residents are served by a SSWS. There are 26,800 residents in 189 DUCs that are neither fully nor partially intersected by a CWS service area. We estimate that most of these residents rely on private domestic wells. (However, as we note elsewhere, this may be an overestimation because of uneven data collection by counties.)

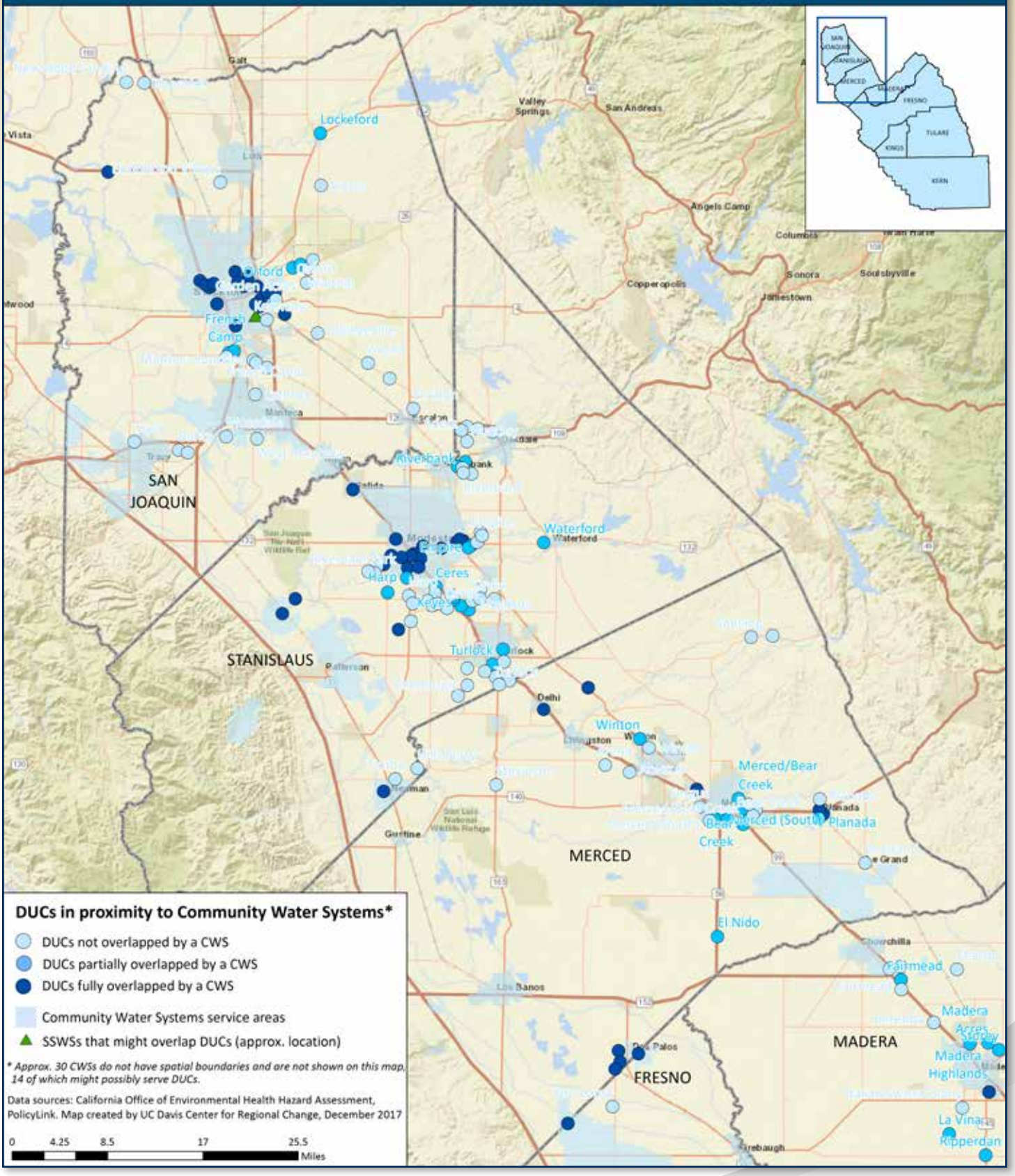
Table 1. Estimates of DUC Population Numbers Served by CWS and Domestic Wells/SSWS

Drinking Water Provision Source	No. of Residents (DUC Count)	CWS Boundary Overlap Type	No. of Residents (DUC Count)	CWS Boundary Overlap Type	No. Residents (DUC count)
CWS	247,000 (170)	Full	73,500 (91)	Partial	320,500 (261); 92%
Domestic Wells or SSWSs	26,800 (189)	None	NA	NA	26,800 (189); 8%
					347,300 (450); 100%

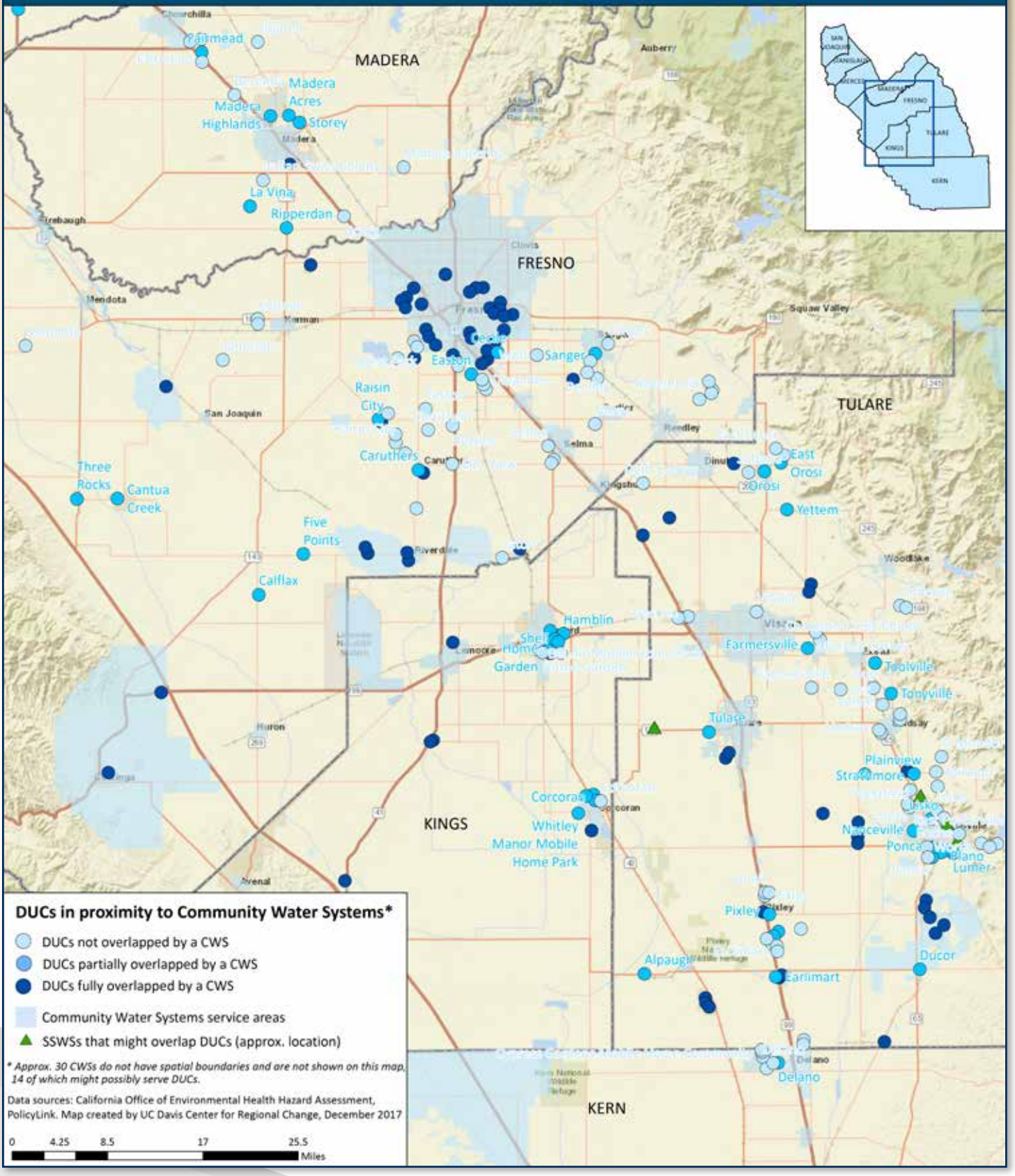
Map 1. DUCs and Access to Community Water Systems | San Joaquin Valley, California



Map 1a. DUCs and Access to Community Water Systems | Northern San Joaquin Valley, California



Map 1b. DUCs and Access to Community Water Systems | Central San Joaquin Valley, California



Map 1c. DUCs and Access to Community Water Systems | Southwestern San Joaquin Valley, California

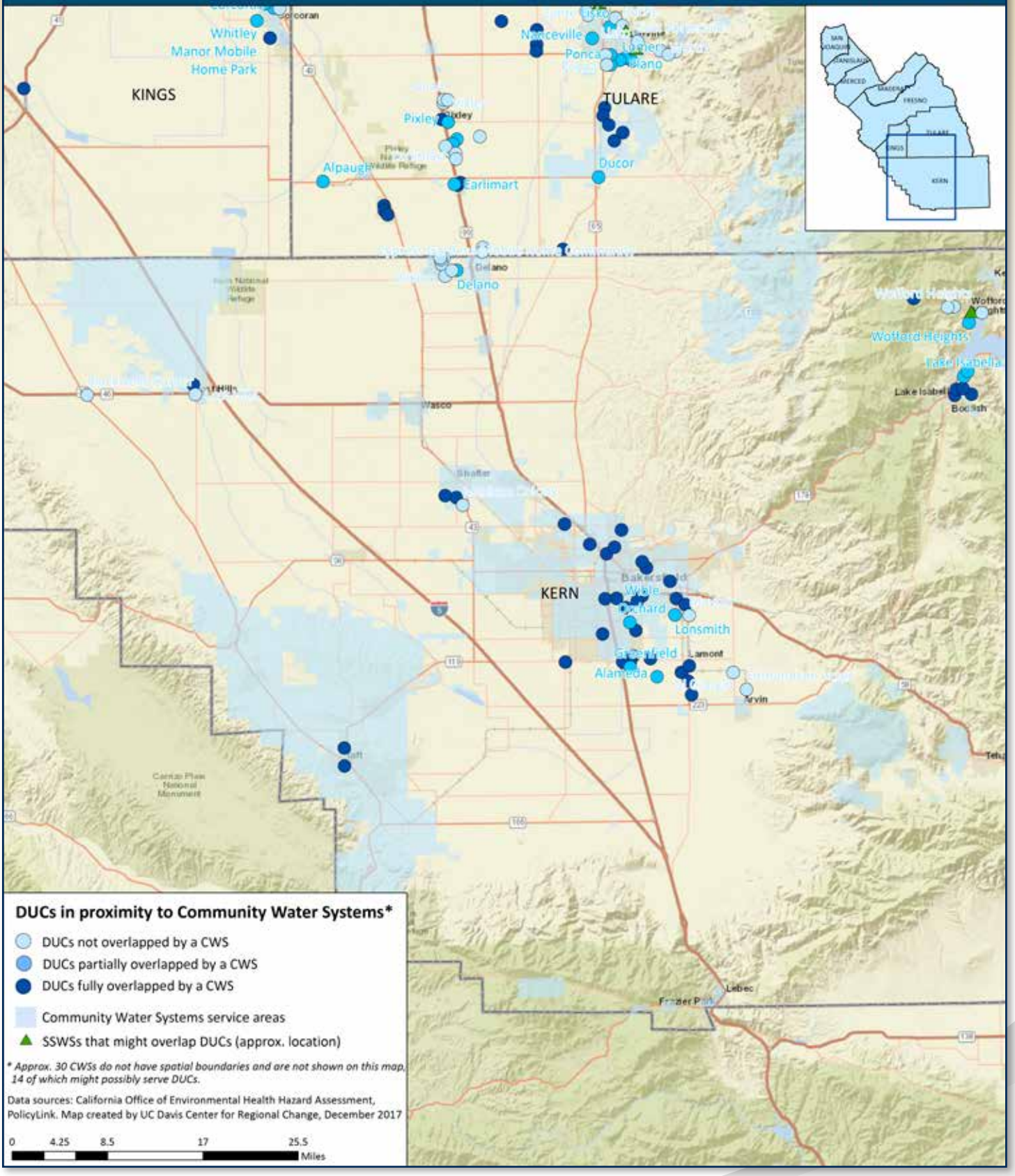


Figure 1. CWSs Serving DUCs (N=155), by System Size (left), and Size and Ownership (right)

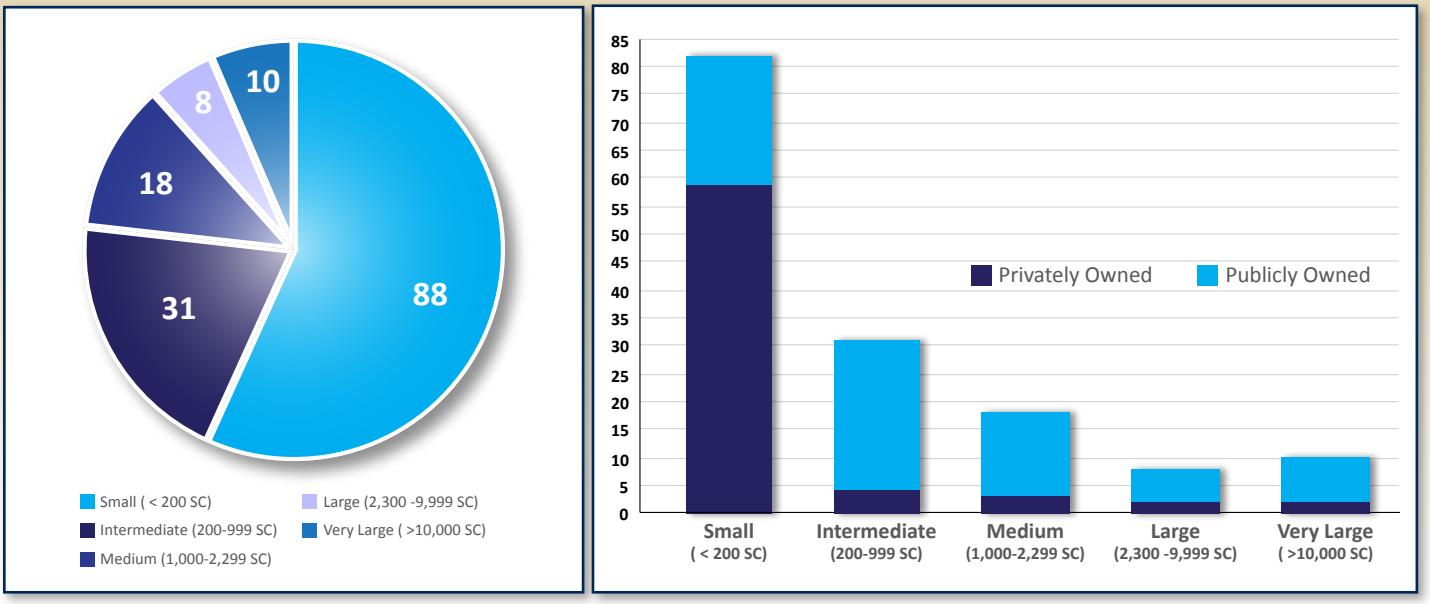


Figure 1 illustrates the 155 CWSs that either fully or partially overlap a DUC, organized by size and ownership type. Most CWSs serving DUCs are small (57%) and, regardless of size, are nearly evenly split between private (45%) and public (50%) ownership.[6] Most of the 88 small systems are privately owned (67%), while the 67 systems in the remaining size categories are publicly owned (84%).

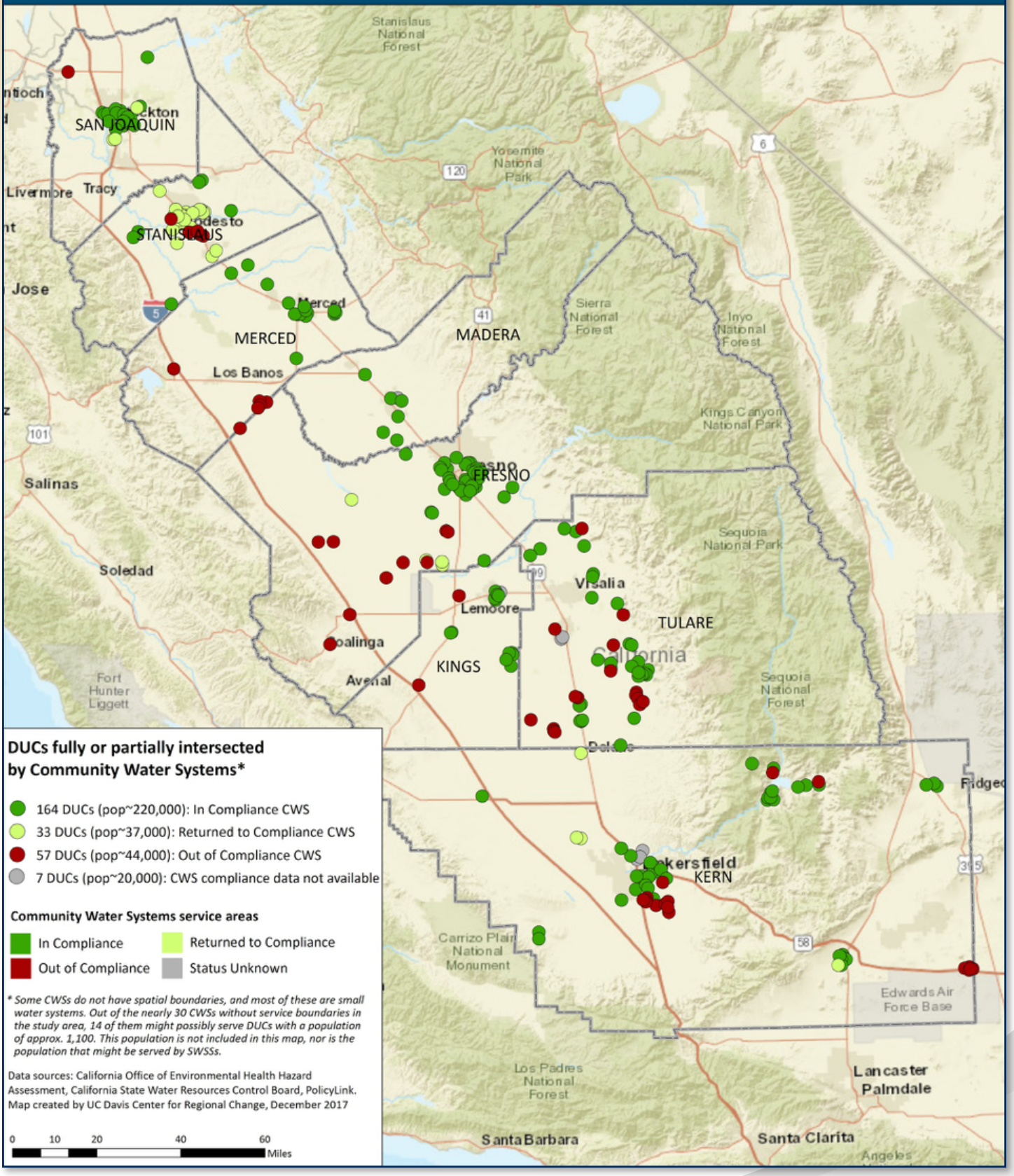
This analysis of CWS types and sizes demonstrates the complexity of the CWS and SSWS landscape in the SJV. It highlights areas in need of urgent prioritization. These include 189 DUCs, whose 26,800 residents do not currently have access to a CWS, and are likely drinking untreated and unregulated private well water. However, the spatial analysis also shows that there are many residents who can be served by an existing CWS if proper physical and/or operational connections can be established.

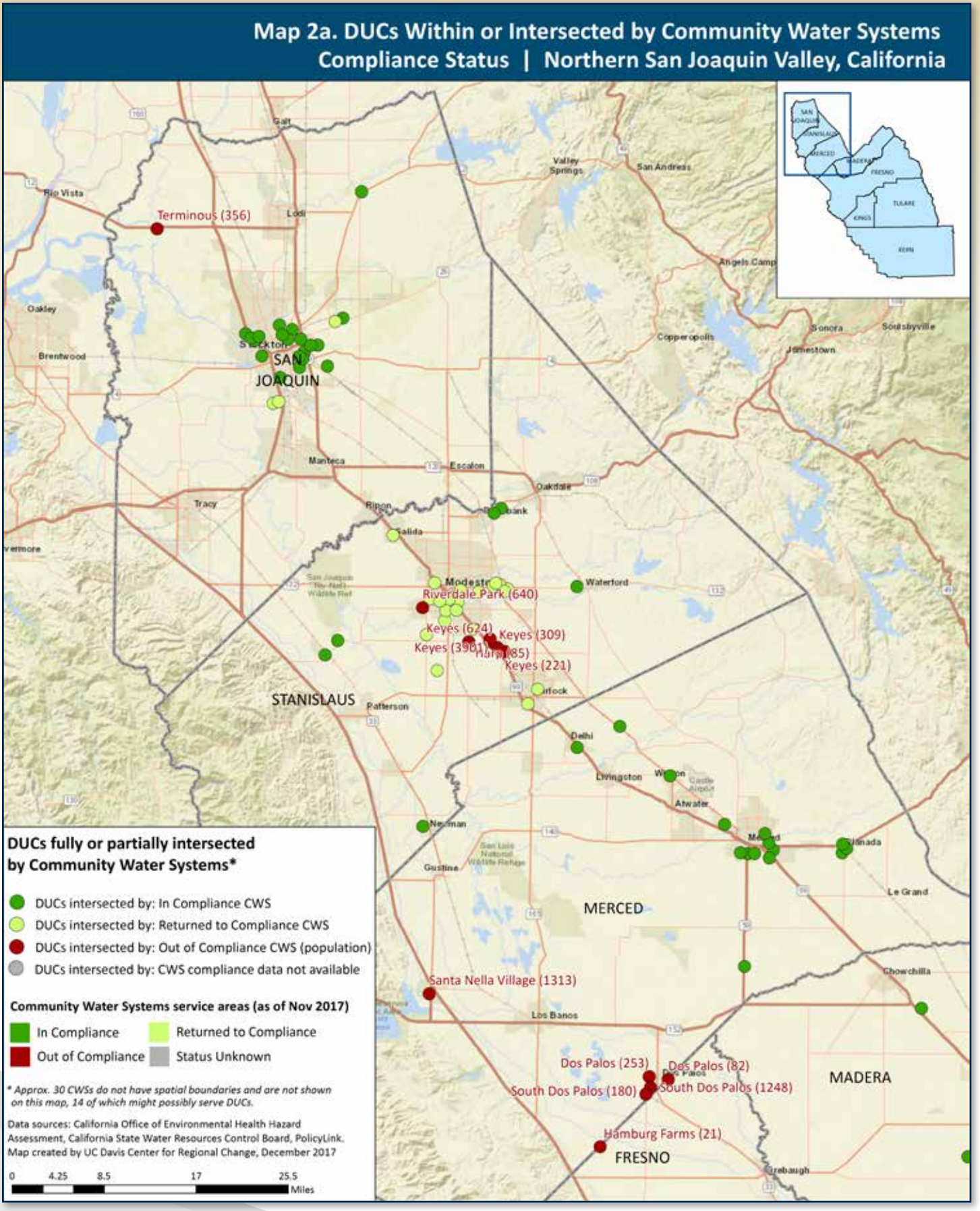
B. Drinking Water is Unsafe in Many DUCs

Our research fills a key gap in existing research on water quality violations by analyzing the quality of water provided to incorporated versus unincorporated communities. As a proxy for the quality of the drinking water delivered, we use a CWS's overall SDWA compliance status (e.g., either in compliance, out of compliance, or returned to compliance) without differentiating for the type of violation (e.g., the specific contaminant).

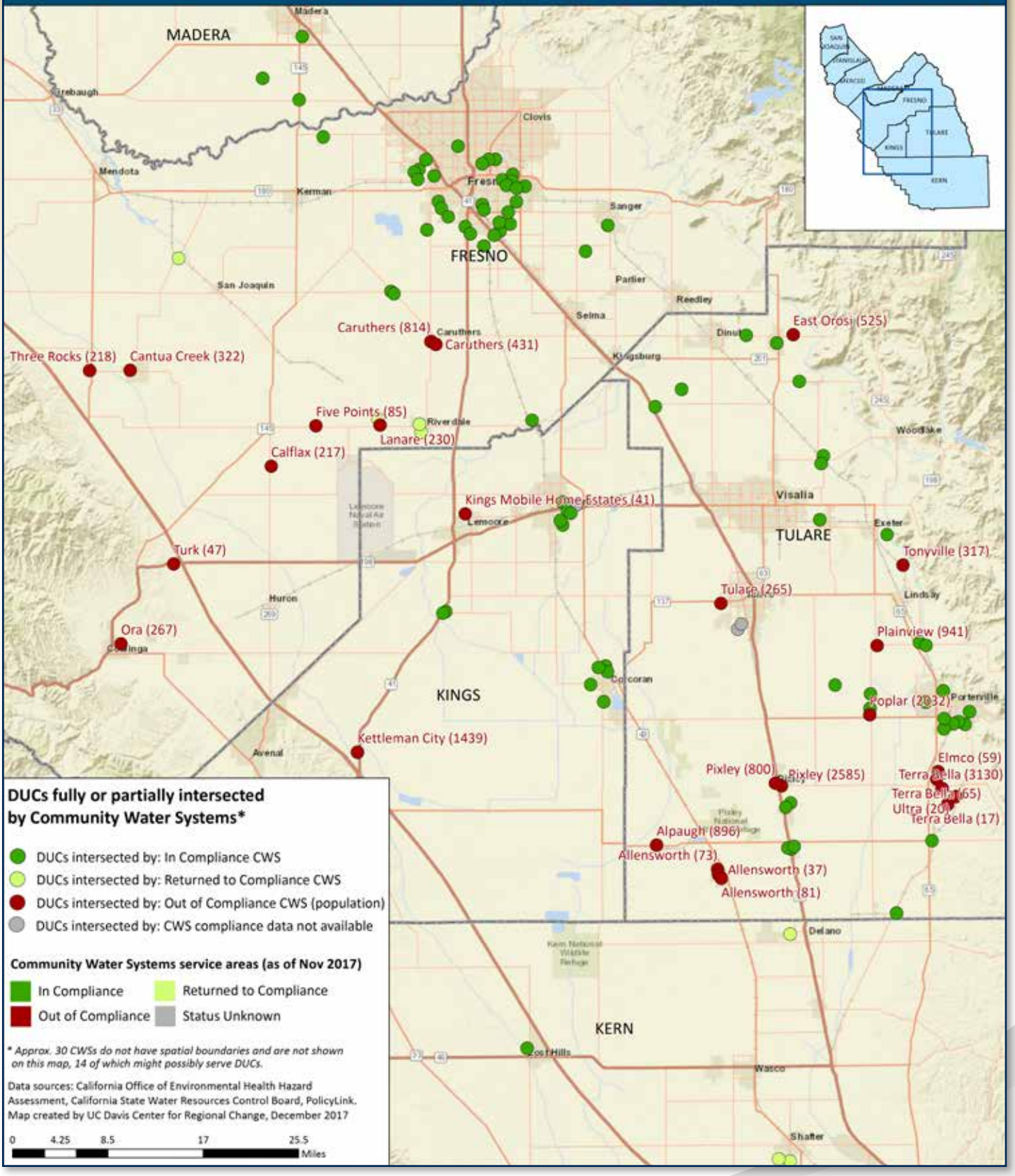
Maps 2 and 2a-c shows the extent to which CWSs that fully and partially overlap a DUC are actually delivering SDWA-compliant water. Table 2 summarizes how many residents of SJV DUCs are served by CWSs with different types of compliance status. Of the 321,000 residents living in 261 DUCs fully or partially overlapped by a CWS, 257,000 residents (80%) of 197 DUCs are likely receiving SDWA-compliant water. However, there are still 44,000 residents (14%) in 57 DUCs who are likely to be receiving water from CWSs that are out of compliance. Close to 20,000 residents (6%) in 7 DUCs are likely being supplied water from CWSs with unknown status. There are also 26,800 residents (8% of the total DUC population) in 189 DUCs living outside CWS boundaries who receive drinking water of unknown quality. Of the 155 CWSs that our analysis indicates are serving a DUC, 96 (62%) are compliant, 15 (10%) have returned to compliance, and 37 (24%) are out of compliance.[7]

Map 2. DUCs Within or Intersected by Community Water Systems Compliance Status | San Joaquin Valley, California

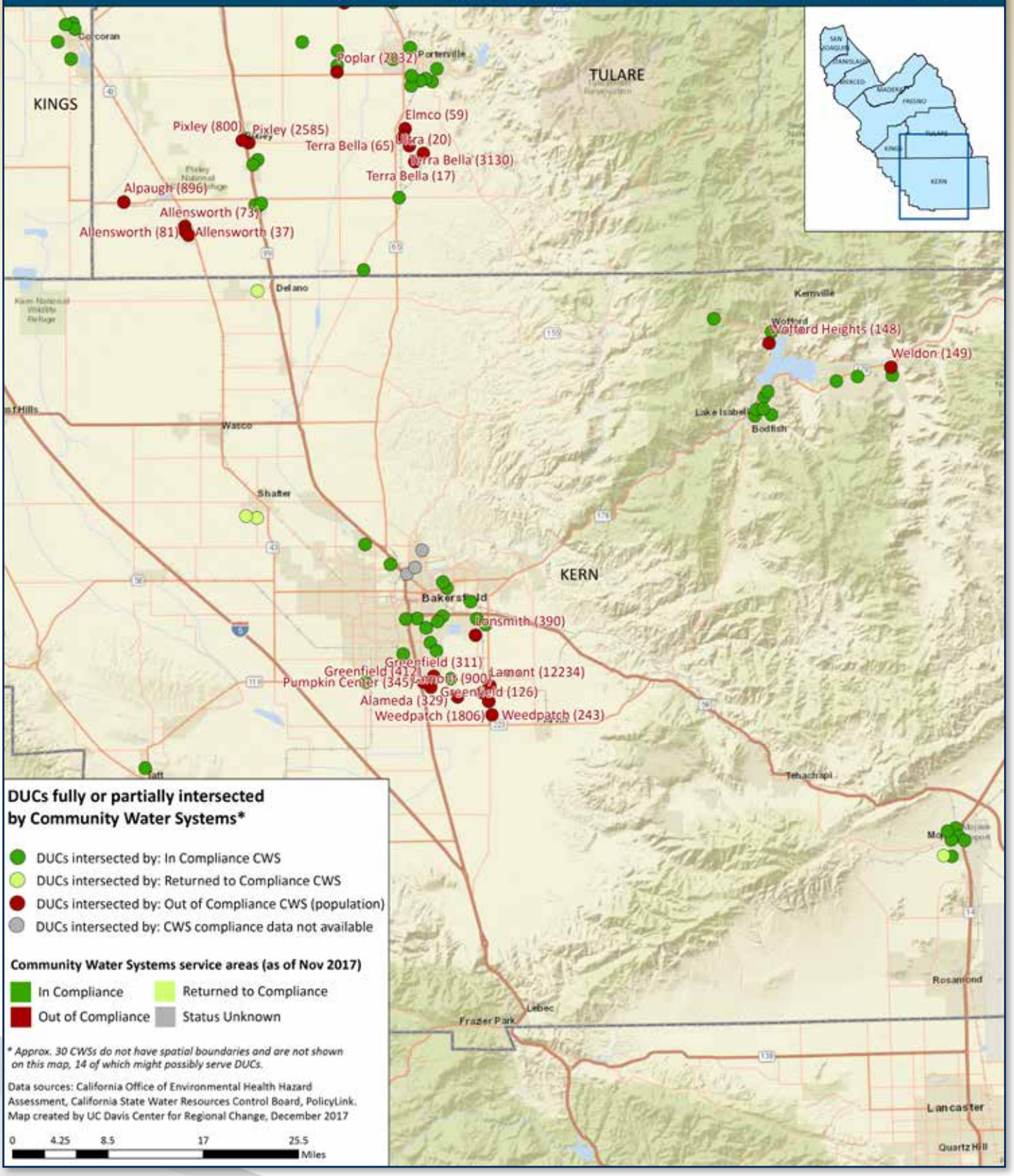



Map 2a. DUCs Within or Intersected by Community Water Systems
Compliance Status | Northern San Joaquin Valley, California
Terminous (356)
Riverdale Park (640)
Keyes (624)
Keyes (309)
Keyes (221)
Santa Nella Village (1313)
Dos Palos (253)
Dos Palos (82)
South Dos Palos (180)
South Dos Palos (1248)
Hamburg Farms (21)
STANISLAUS
MERCED
MADERA
FRESNO
SAN JOAQUIN
DUCs fully or partially intersected by Community Water Systems*
DUCs intersected by: In Compliance CWS
DUCs intersected by: Returned to Compliance CWS
DUCs intersected by: Out of Compliance CWS (population)
DUCs intersected by: CWS compliance data not available
Community Water Systems service areas (as of Nov 2017)
In Compliance
Returned to Compliance
Out of Compliance
Status Unknown
* Approx. 30 CWSs do not have spatial boundaries and are not shown on this map, 14 of which might possibly serve DUCs.
Data sources: California Office of Environmental Health Hazard Assessment, California State Water Resources Control Board, PolicyLink.
Map created by UC Davis Center for Regional Change, December 2017
0 4.25 8.5 17 25.5
Miles

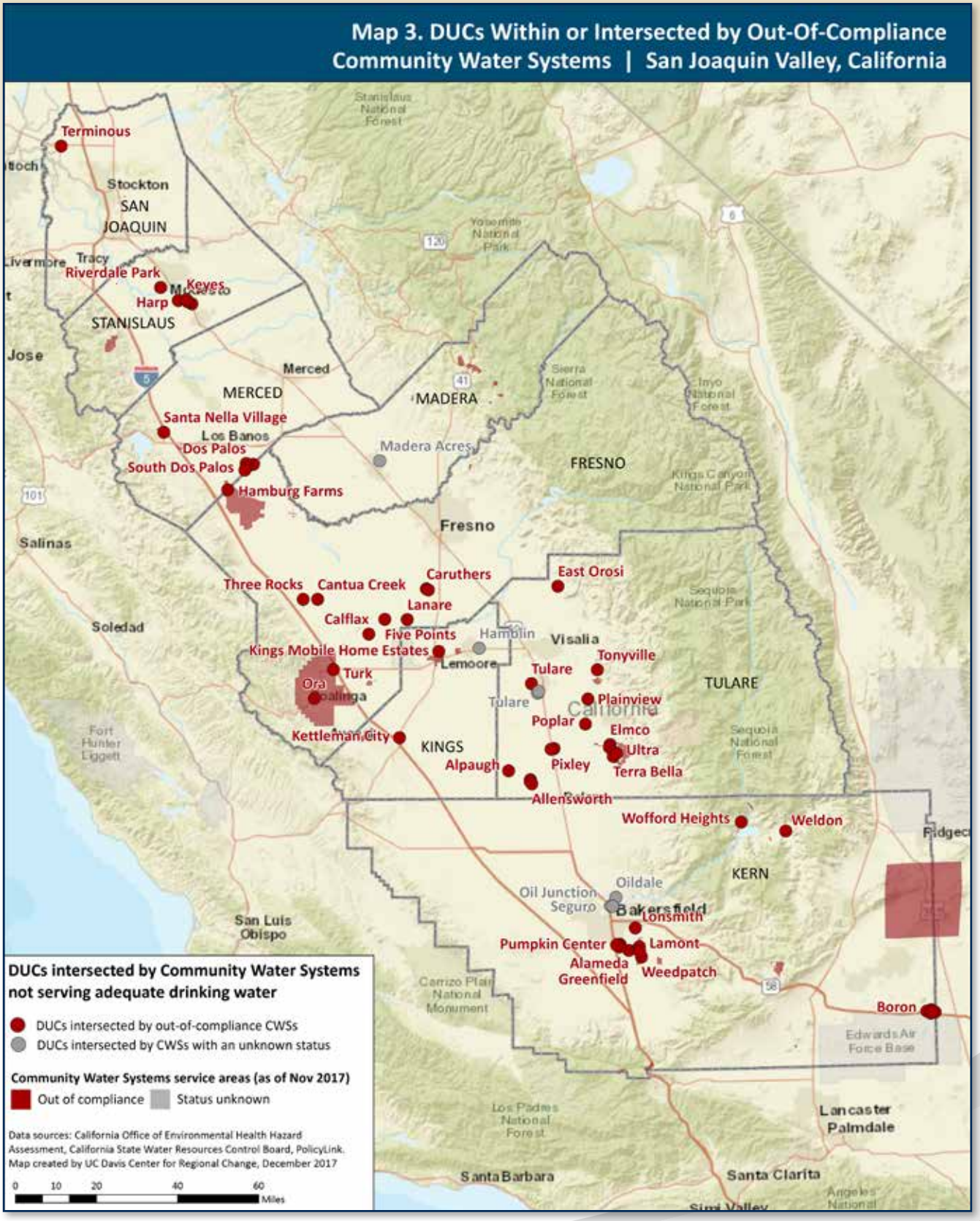
Map 2b. DUCs Within or Intersected by Community Water Systems Compliance Status | Central San Joaquin Valley, California



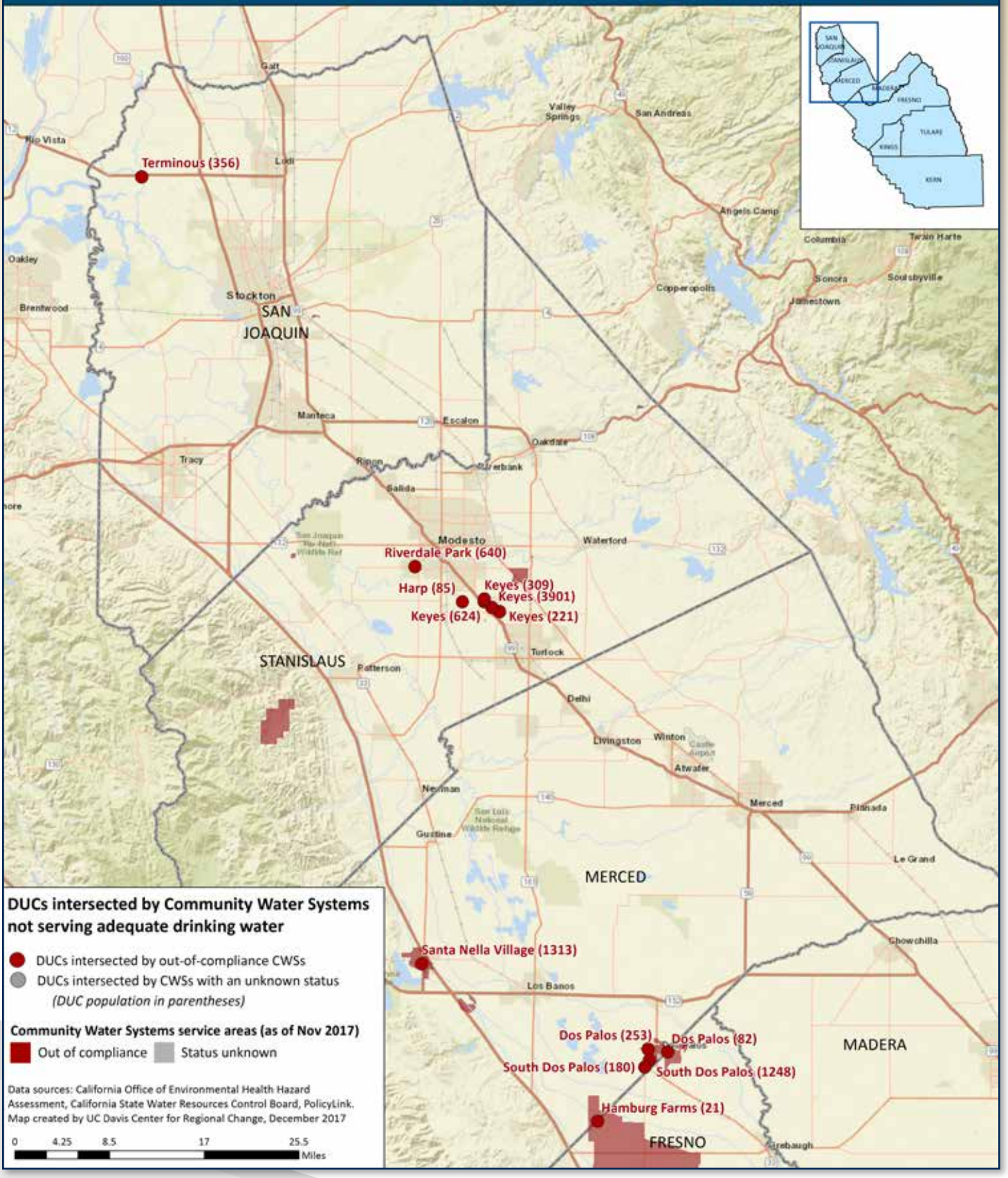
Map 2c. DUCs Within or Intersected by Community Water Systems Compliance Status | Southwestern San Joaquin Valley, California



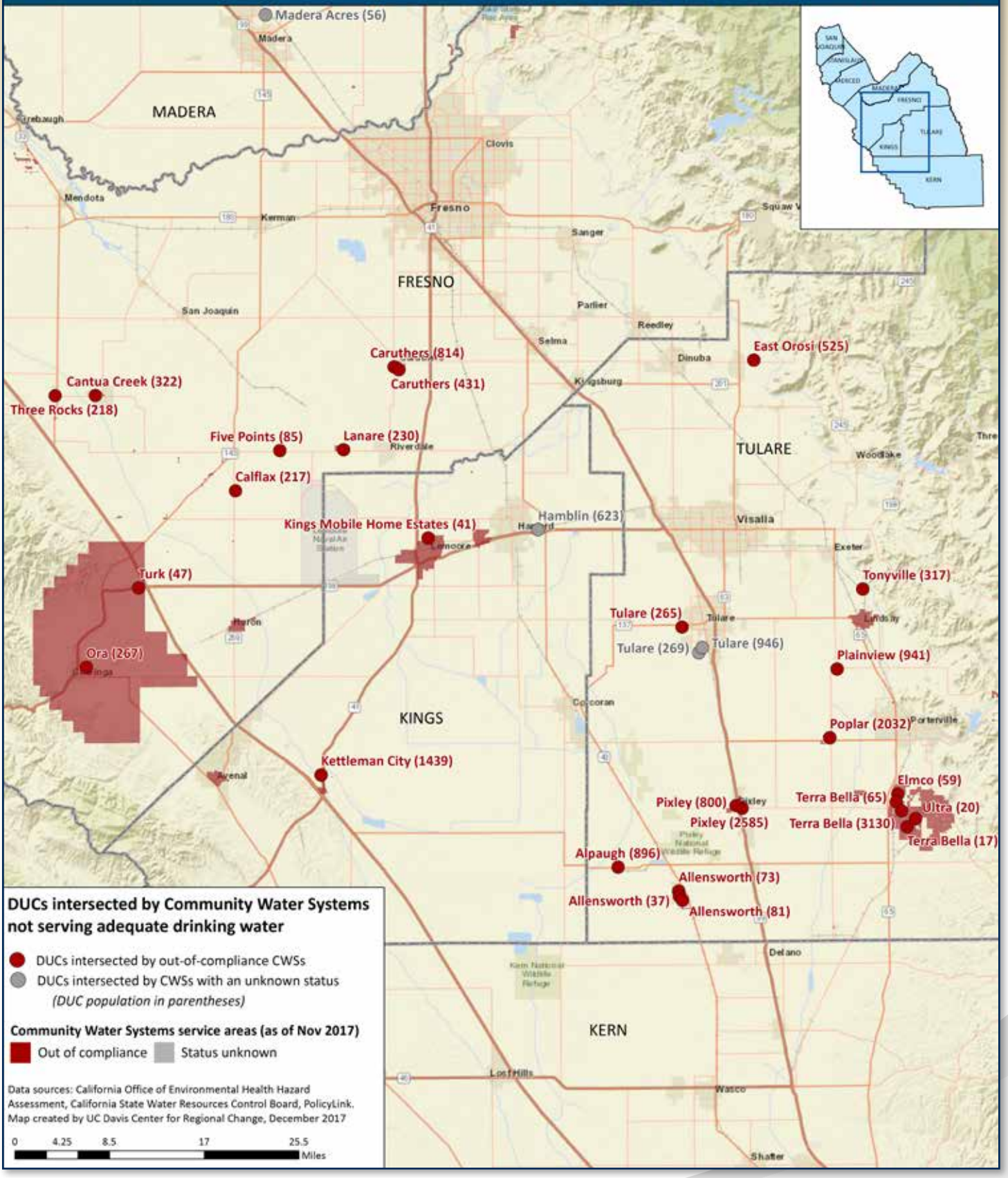
Maps 3 and 3a-c document the 57 DUCs that are intersected by out-of-compliance CWSs, and the 7 DUCs that are intersected by CWSs with unknown compliance status, providing the number of residents affected (see Table 2). In total, approximately 64,000 people in 64 DUCs located across all eight of the SJV counties are likely receiving potentially unsafe drinking water.



Map 3a. DUCs Within or Intersected by Out-Of-Compliance Community Water Systems | Northern San Joaquin Valley, California



Map 3b. DUCs Within or Intersected by Out-Of-Compliance Community Water Systems | Central San Joaquin Valley, California



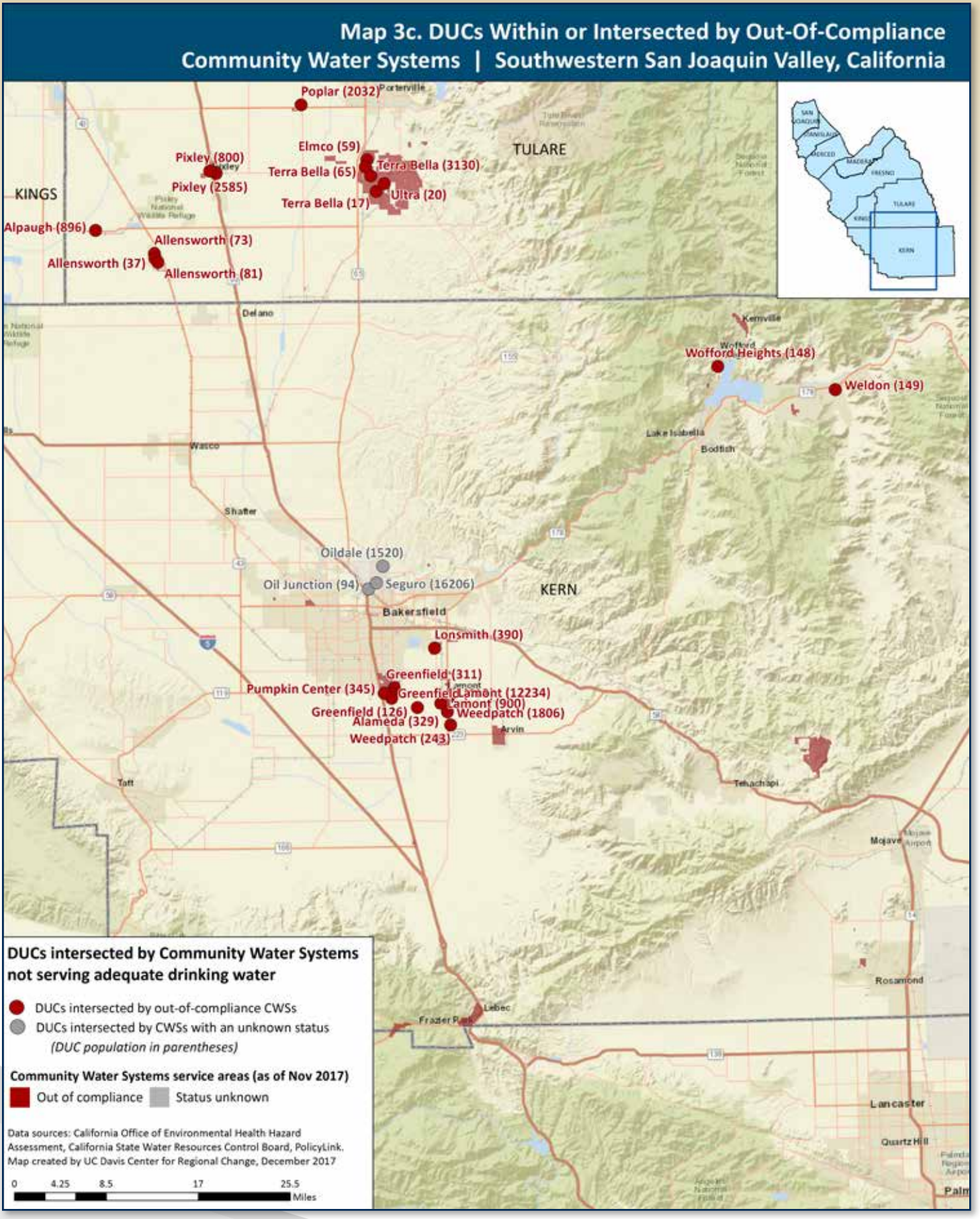
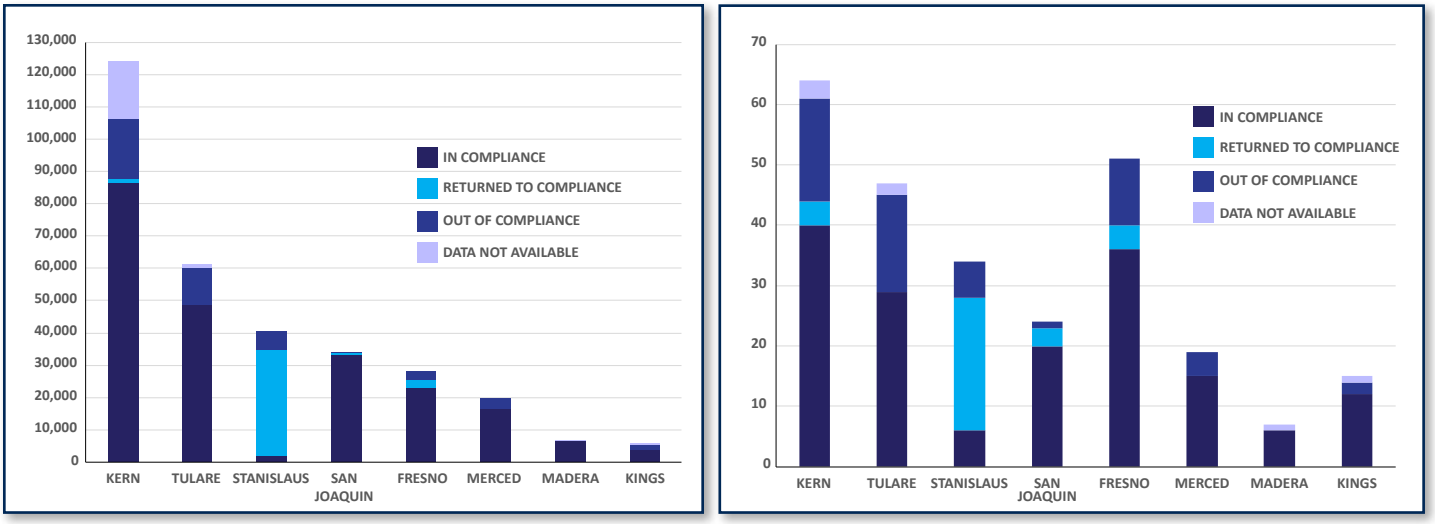

Map 3c. DUCs Within or Intersected by Out-Of-Compliance Community Water Systems | Southwestern San Joaquin Valley, California
Poplar (2032)
Porterville
Elmco (59)
Terra Bella (3130)
Terra Bella (65)
Ultra (20)
Terra Bella (17)
Pixley (800)
Pixley (2585)
KINGS
TULARE
Alpaugh (896)
Allensworth (73)
Allensworth (37)
Allensworth (81)
Delano
Kernville
Wofford Heights (148)
Weldon (149)
Lake Isabella
Bodfish
Wasco
Shafter
Oildale (1520)
Oil Junction (94)
Seguro (16206)
KERN
Bakersfield
Lonsmith (390)
Greenfield (311)
Pumpkin Center (345)
Greenfield Lamont (12234)
Lamont (900)
Greenfield (126)
Weedpatch (1806)
Alameda (329)
Weedpatch (243)
Arvin
Taft
Tehachapi
Mojave
Rosamond
Lebec
Frazier Park
Lancaster
Quartz Hill
DUCs intersected by Community Water Systems not serving adequate drinking water
DUCs intersected by out-of-compliance CWSs
DUCs intersected by CWSs with an unknown status
(DUC population in parentheses)
Community Water Systems service areas (as of Nov 2017)
Out of compliance
Status unknown
Data sources: California Office of Environmental Health Hazard Assessment, California State Water Resources Control Board, PolicyLink.
Map created by UC Davis Center for Regional Change, December 2017
0 4.25 8.5 17 25.5
Miles

Table 2. Compliance Status of CWSs serving DUCs

No. of Residents	DUC count	CWS Compliance Status	DUC Overlap with CWS Boundary
198,000	129	"In Compliance" or "Returned to Compliance"	Full
59,000	68	"In Compliance" or "Returned to Compliance"	Partial
257,000 residents served by CWS meeting SDWA regulations.			
30,000	36	"Out of Compliance"	Full
14,000	21	"Out of Compliance"	Partial
44,000 residents served by CWS NOT meeting SDWA regulations.			
20,000	7	Status Unknown	Full; Partial

Figure 2, below, shows the compliance status of CWSs that are fully and partially overlapping a DUC, in each San Joaquin Valley county. Kern County has the highest number of DUCs (17, with 18,412 residents) are likely served by out-of-compliance CWSs, followed by Tulare County (16 DUCs with 11,843 residents). Most of the unsafe water is being supplied by small systems (24 out of 37). This suggests that the SWRCB could be more active in ensuring SDWA compliance in the counties where the state has direct enforcement authority over out-of-compliance small systems, i.e. in Fresno (9 systems), Kern (7 systems), and Tulare (5 systems).

Figure 2. CWSs Serving DUC Populations (left) and DUC Count (right) by Compliance Status and County (includes DUCs that are either fully or partially intersected by a CWS).



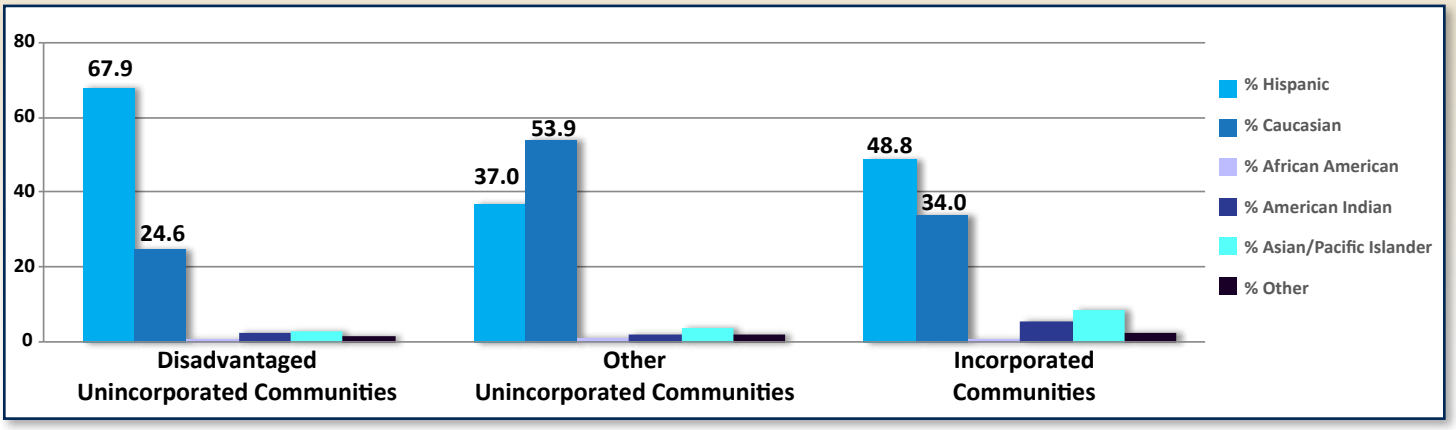
In many SJV counties, a higher proportion of the CWSs that serve DUCs are supplying unsafe water, compared to the proportion of CWSs that serve non-disadvantaged communities. For example, in Fresno, 41% of CWSs serving DUCs are supplying unsafe water, while 23% of CWSs serve non-DUCs with unsafe water. In addition, of the CWSs that serve areas in Fresno, 59% are delivering safe water to DUCs while 71% are delivering safe water to non-DUC areas.

C. There are Racial and Ethnic Disparities in Access to Safe Drinking Water

Race and ethnicity are important factors in understanding who has access to safe drinking water in the SJV. Patterns of racial and ethnic disparity become apparent when we differentiate between DUCs (i.e., where residents earn less than 80% of the state Median Household Income, or MHI) and those that are not disadvantaged.[8] This analysis differentiates between DUCs, Other Unincorporated Communities (UCs) whose residents do not fall under the 80% of MHI, and Incorporated Communities (ICs) that do have city governments.

The demographics of DUCs compared to those of UCs, as well as those of ICs, are strongly skewed on racial and ethnic lines. For example, while Hispanics make up just under half (48.9%) of the total population of the SJV, they represent over two thirds (67.9%) of residents in DUCs, and only 37% of residents in the comparatively wealthy UCs. Meanwhile, Caucasians make up 36.5 % of all SJV residents, but make up only 24.6% of DUC residents, and over half (53.9%) of other UCs (Figure 5).

Figure 3. San Joaquin Valley Racial and Ethnic Demographics in DUCs, UCs and ICs



The proportion of Hispanic residents in several DUCs is significantly higher than the regional average. These include residents of DUCs such as Cantua Creek/Three Rocks (92%), Lost Hills (91%), South Dos Palos (81%), and East Porterville (78%). In some cases, DUCs have a far greater proportion of Hispanic residents than do neighboring, incorporated cities. South Dos Palos is 81% Hispanic, but the nearby incorporated city of Dos Palos is 61.3% Hispanic. Similarly, East Porterville is 78% Hispanic, but in the bordering city of Porterville, the number drops to 62.4%.

Figures 4 and 5 show the racialized pattern of resident access to CWSs. These charts illustrate both the racial/ethnic disparity within each category of community (DUC, other UC, and Incorporated City) and between these categories. Note: the "All Others" category represents non-Hispanic people of color. Figure 4A presents the case of populations living in areas that are not intersected by a CWS. Here, we find that nearly two thirds (63.6%) of residents living in DUCs that are not intersected by a CWS are Hispanic, compared to much lower percentages for Caucasians (30.3%).

Figure 4. Percent of Population not intersected by CWSs

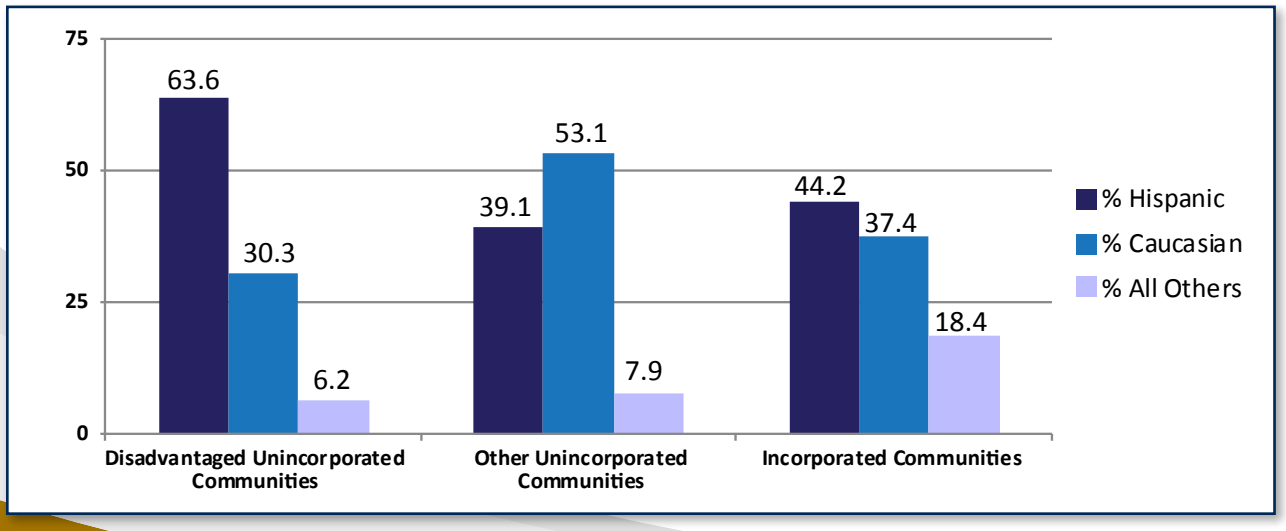
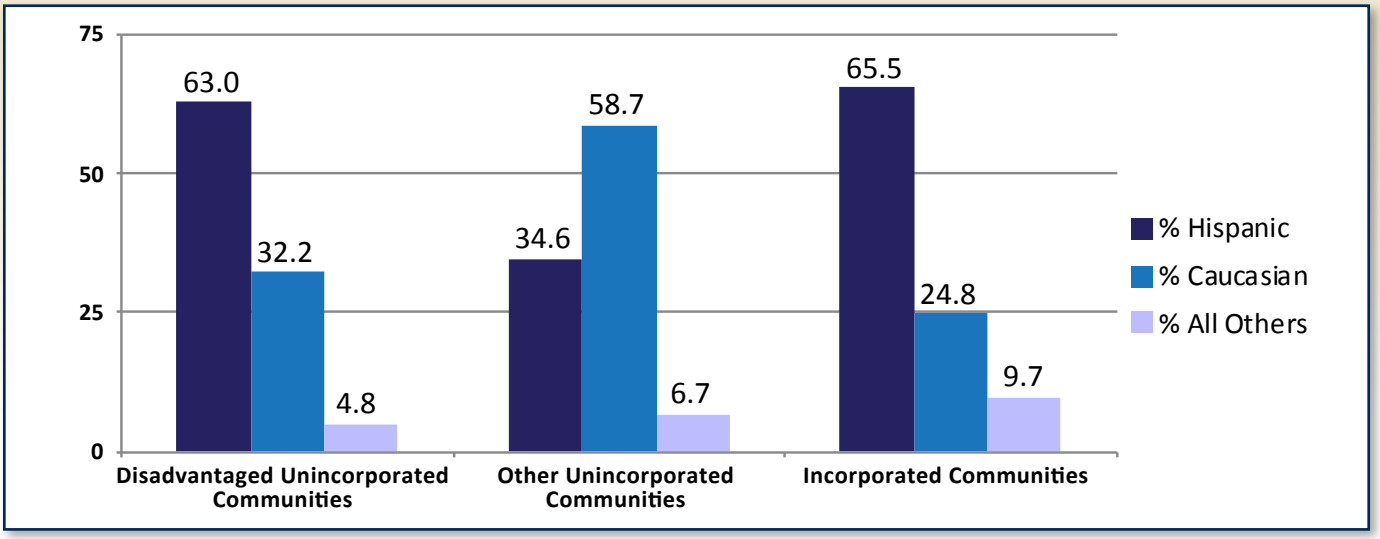


Figure 5 shows the racial/ethnic distribution of those living in areas served by an out-of-compliance CWS. Here we see that Hispanics make up a much larger percentage (63%) of the population of DUCs served by out-of-compliance CWSs, as compared to the percentage of Caucasians (32.2%). Hispanics also make up a much larger proportion of the residents of incorporated cities served by out-of-compliance CWSs than Caucasians do. This indicates that lack of access to clean water for Hispanics is a phenomenon that is not confined to DUCs.

Figure 5. Percent of Population Intersected by Out-of-Compliance CWSs



As shown in Table 4, Hispanic residents represent 49% of the population in communities that are intersected by an in-compliance CWS, and 57% of the population in areas intersected by an out-of-compliance CWS. For non-Hispanic people of color in the "All others" category, over twice the percentage live in communities intersected by out-of-compliance CWCs, than live in communities intersected by in-compliance CWSs (16.2% and 7.5% respectively).

Table 3. Demographics of Populations Served by In and Out-of-Compliance CWSs

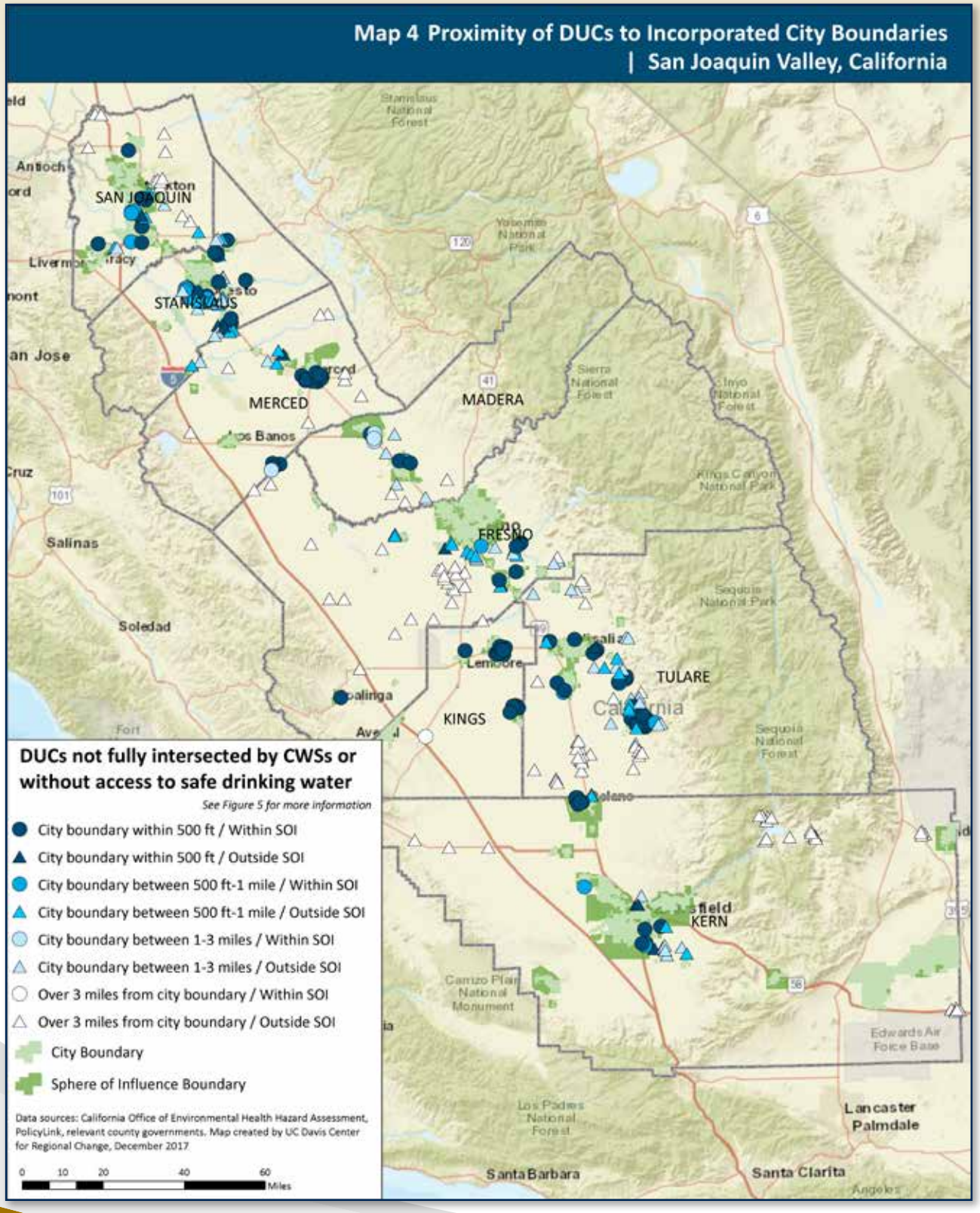
CWS Compliance (% population)	Hispanic	Caucasian	All others
In Compliance	49.0%	34.8%	7.5%
Out of Compliance	57.0%	35.8%	16.2%

It is important to note that this analysis does not reveal an intentional racial bias at work in the provision of safe water. However, policymakers, regulators, and advocacy organizations should consider racial/ethnic factors and inequities when devising responses and solutions to the problem of access to safe and clean drinking water.

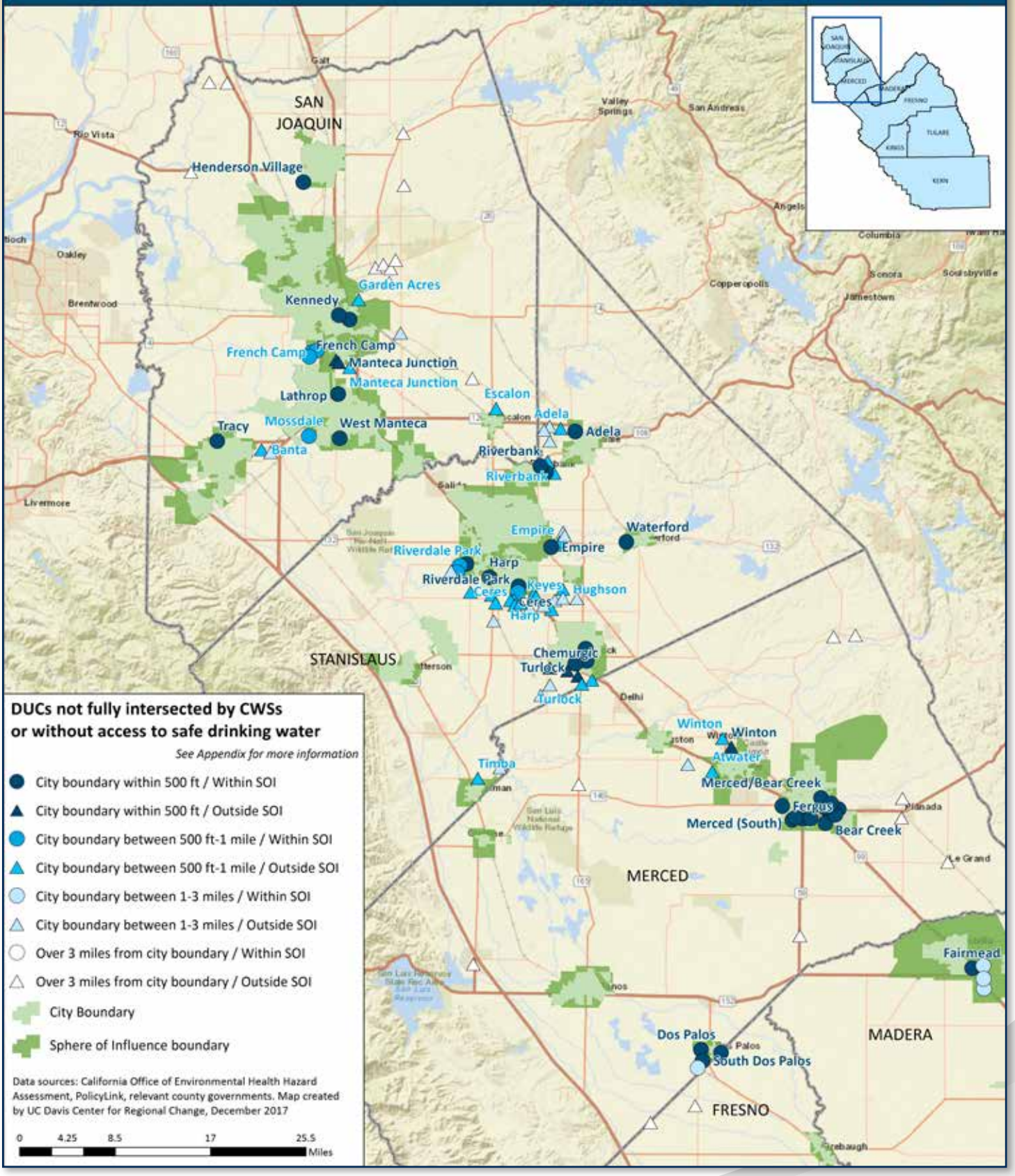
D. Safe Drinking Water is Often Close at Hand

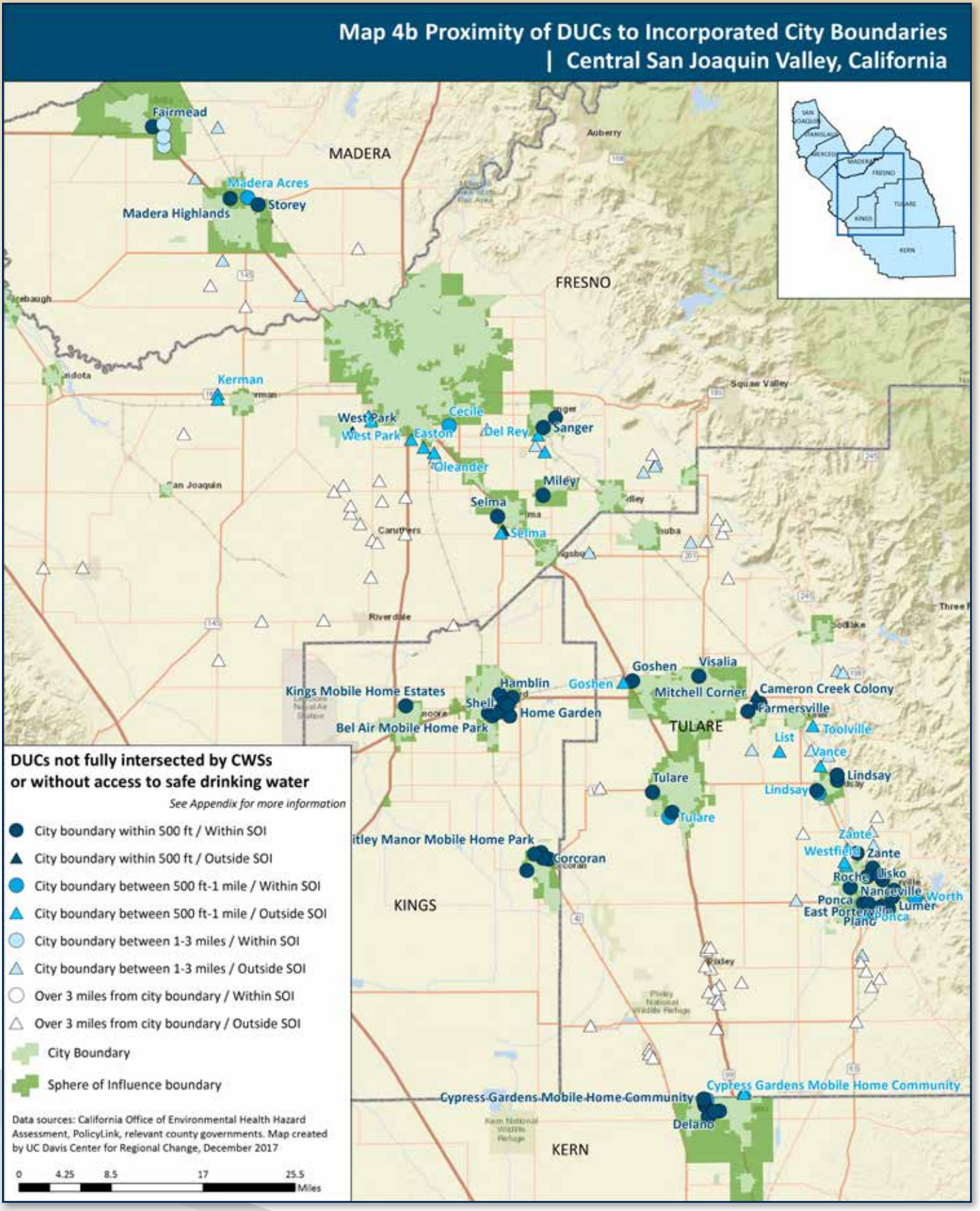
Maps 4 and 5 and their sub-regional versions show the potential for improved service to residents of DUCs by representing the proximity of incorporated cities to DUCs not served by CWSs or other sources of safe drinking water. Both maps look at the 149,544 residents of the 321 DUCs that are not fully intersected by CWSs, or are intersected by CWSs that are not currently providing safe drinking water. For most of these residents, the distance between DUCs and cities, as well as between DUCs and other types of publicly owned water systems, is not great. This suggests that the raw distance between DUCs and CWSs may not be the main obstacle to providing DUC residents with safe drinking water. Instead, the main obstacle may be the lack of political will to mobilize the economic resources necessary to extend city services to these neighbors.

As shown in Maps 4 and 4.a-c, as well as Figure 5, over 40,000 residents (27% of the total SJV DUC population) of 87 DUCs with inadequate drinking water live within 500 feet of a city boundary, and within its Sphere of Influence (SOI). Another 17,600 DUC residents (12%) live between 500 feet and one mile of a city boundary. This includes roughly 2,700 residents of 16 DUCs inside, and nearly 15,000 residents of 49 DUCs outside a SOI. Finally, there are approximately 45,000 DUC residents (30%) in 101 DUCs who live more than three miles outside a city boundary (1,400 inside and 44,000 outside a SOI).



Map 4a Proximity of DUCs to Incorporated City Boundaries | Northern San Joaquin Valley, California




Map 4b Proximity of DUCs to Incorporated City Boundaries | Central San Joaquin Valley, California
MADERA
FRESNO
KINGS
TULARE
KERN
Fairmead
Madera Acres
Madera Highlands
Storey
Auberry
Kerman
West Park
Cecile
Easton
Del Rey
Sanger
Oleander
Miley
Selma
Squaw Valley
Goshen
Visalia
Hamblin
Kings Mobile Home Estates
Shell
Home Garden
Bel Air Mobile Home Park
Mitchell Corner
Cameron Creek Colony
Farmersville
Toolville
List
Vance
Lindsay
Tulare
Corcoran
Zante
Westfield
Ponca
Plano
Pixley
Cypress Gardens Mobile Home Community
Delano
DUCs not fully intersected by CWSs or without access to safe drinking water
See Appendix for more information
City boundary within 500 ft / Within SOI
City boundary within 500 ft / Outside SOI
City boundary between 500 ft-1 mile / Within SOI
City boundary between 500 ft-1 mile / Outside SOI
City boundary between 1-3 miles / Within SOI
City boundary between 1-3 miles / Outside SOI
Over 3 miles from city boundary / Within SOI
Over 3 miles from city boundary / Outside SOI
City Boundary
Sphere of Influence boundary
Data sources: California Office of Environmental Health Hazard Assessment, PolicyLink, relevant county governments. Map created by UC Davis Center for Regional Change, December 2017
0 4.25 8.5 17 25.5 Miles

Map 4c Proximity of DUCs to Incorporated City Boundaries | Southwestern San Joaquin Valley, California

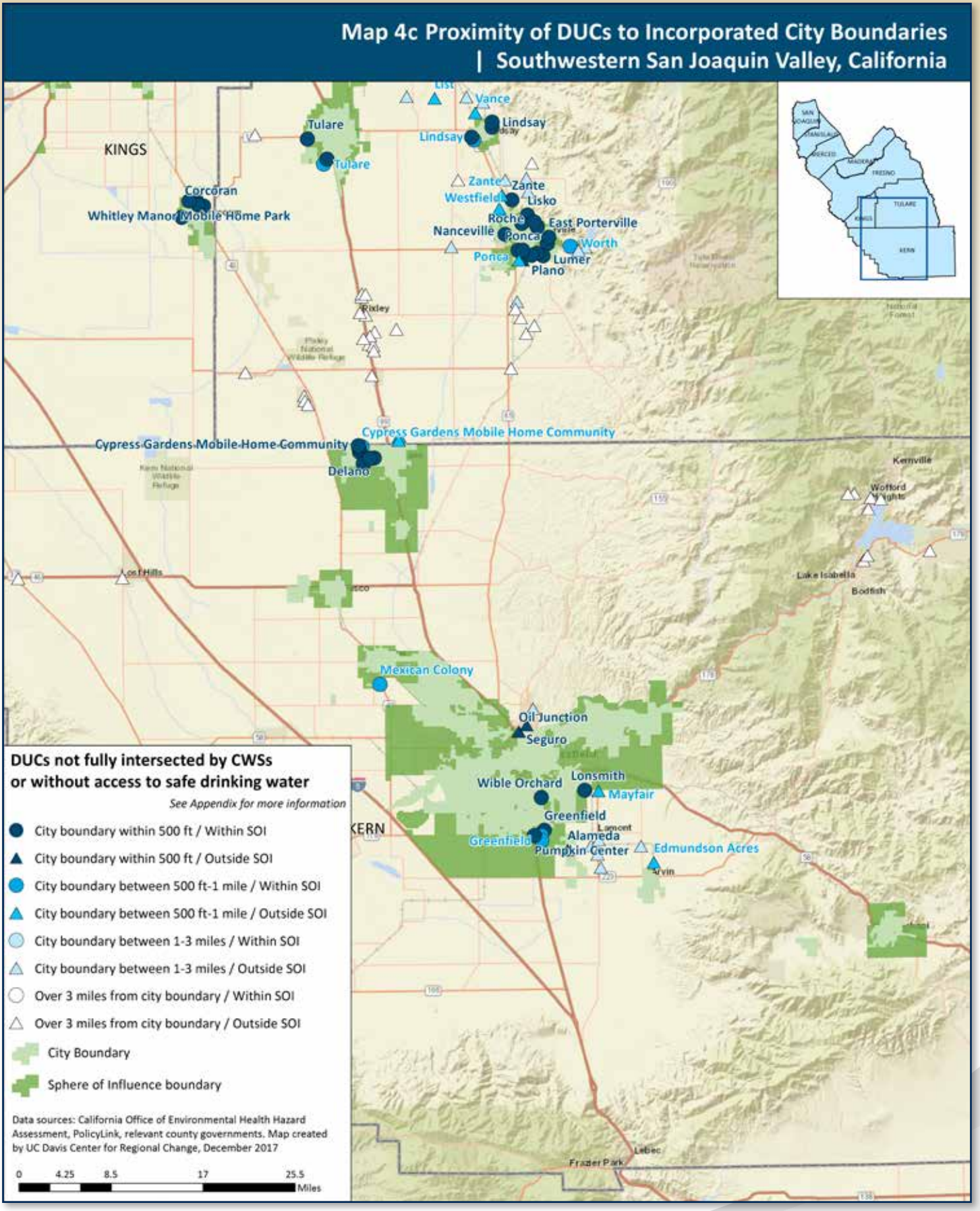
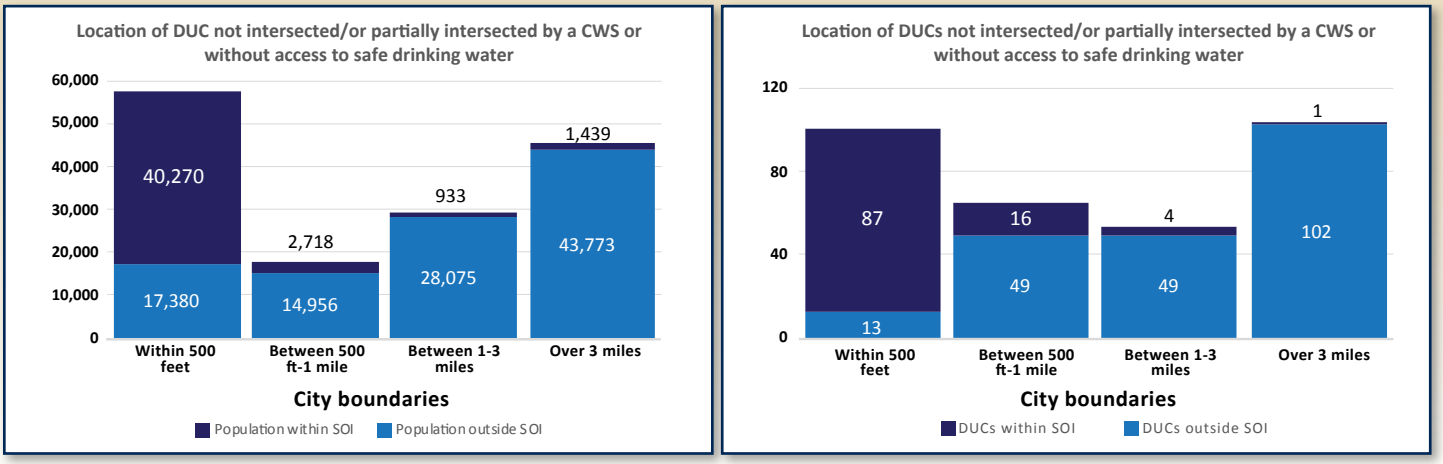
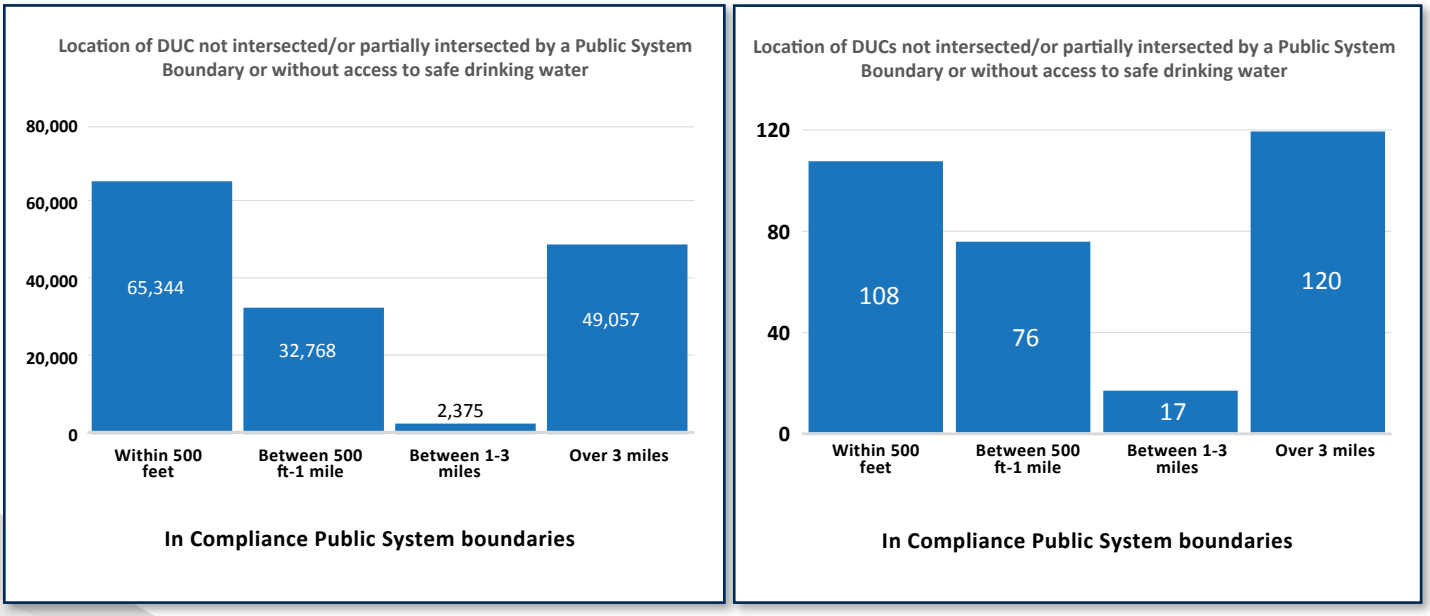


Figure 6. DUC Population (left) and DUC Count (right) by Distance to City Boundaries and Location within/outside the City's SOI. (These graphs represent DUCs that are not fully intersected by CWSs, or are intersected by CWSs that are currently out of compliance.)



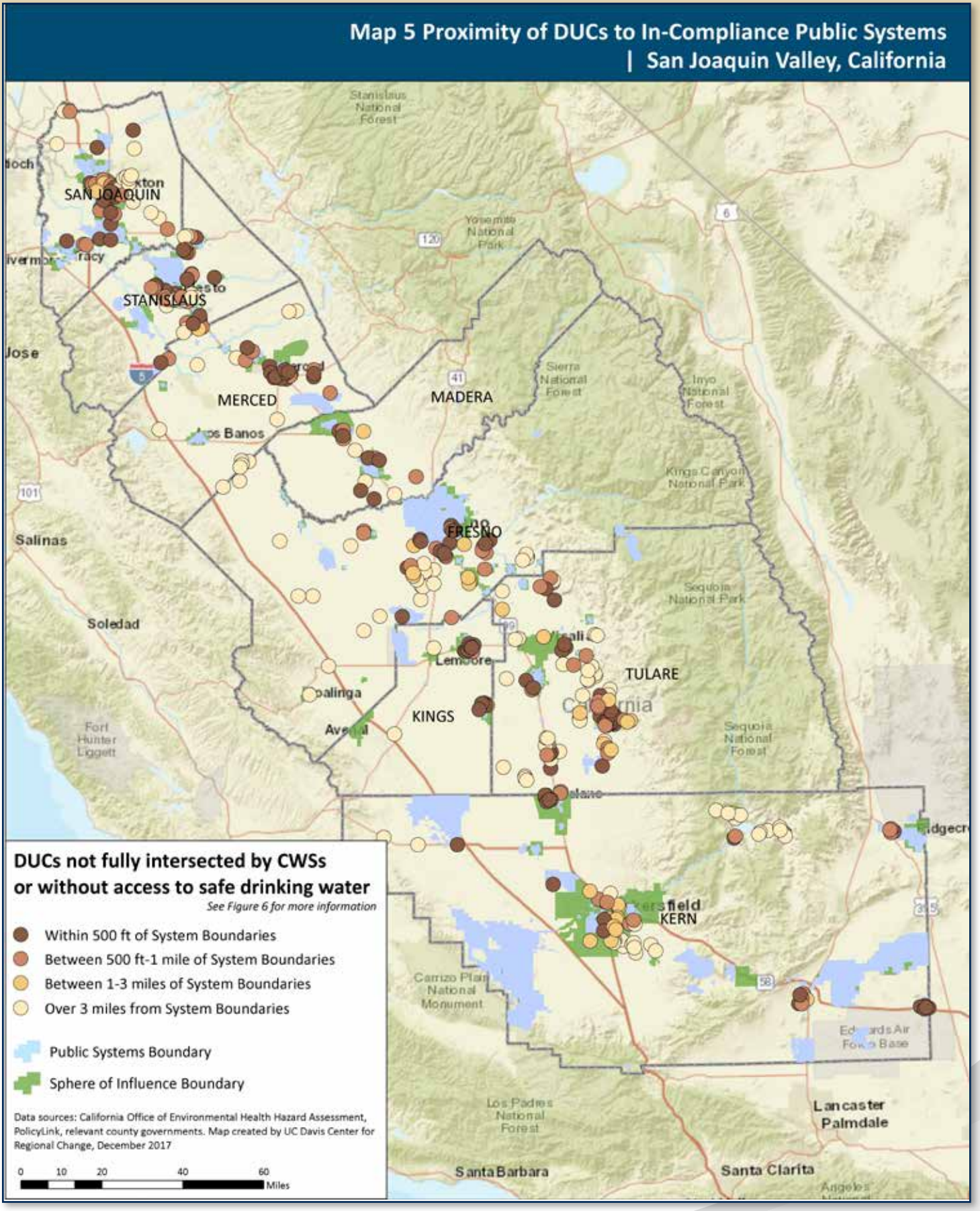
Maps 5 and 5.a-c, as well as Figure 6, show the relationship between residents living in DUCs that are either not fully overlapped by a publicly-owned CWS boundary, or lack access to safe drinking water, and nearby in-compliance systems. A publicly owned water system can by city-owned, as in Map 4.1, but Map 4.2 includes all types of publicly-owned systems e.g. county service areas, community service districts, and other districts. For those DUCs not fully intersected by CWSs or without access to safe drinking water, our analysis identified 65,344 residents (44%) who reside within a 500 ft. of an in compliance publicly-owned CWS boundary, and another 32,768 residents (22%) who live within one mile of a boundary. Of the remaining 51,432 residents, 2% live between 1-3 miles and 33% live 3 or more miles outside a boundary or service area.

Figure 7. Location of DUC Populations (left) and DUC Count (right) by Distance to In-Compliance, Publicly Owned CWS Boundaries. (These charts include DUCs that are not intersected/or partially intersected by a water system boundary or by a CWS without access to safe water.)

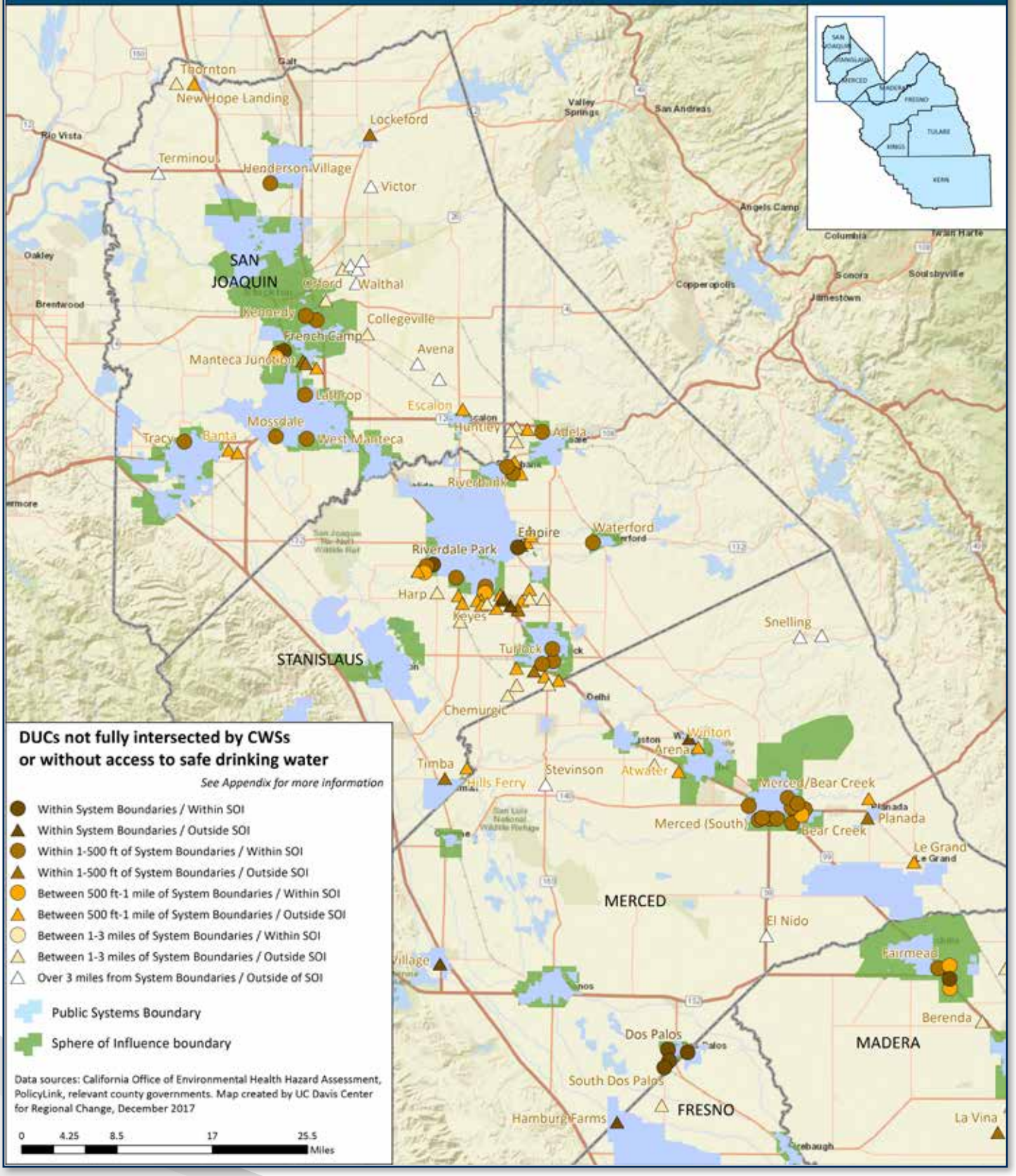


Map 4 and 5, and their sub-regional versions identify the populations living relatively far from a city or publicly owned CWS, who therefore face pressing challenges in gaining access to water system services. However, the maps also confirm that the vast majority of DUC residents live in relatively close proximity to a CWS that could provide water, given the proper investments in infrastructure.

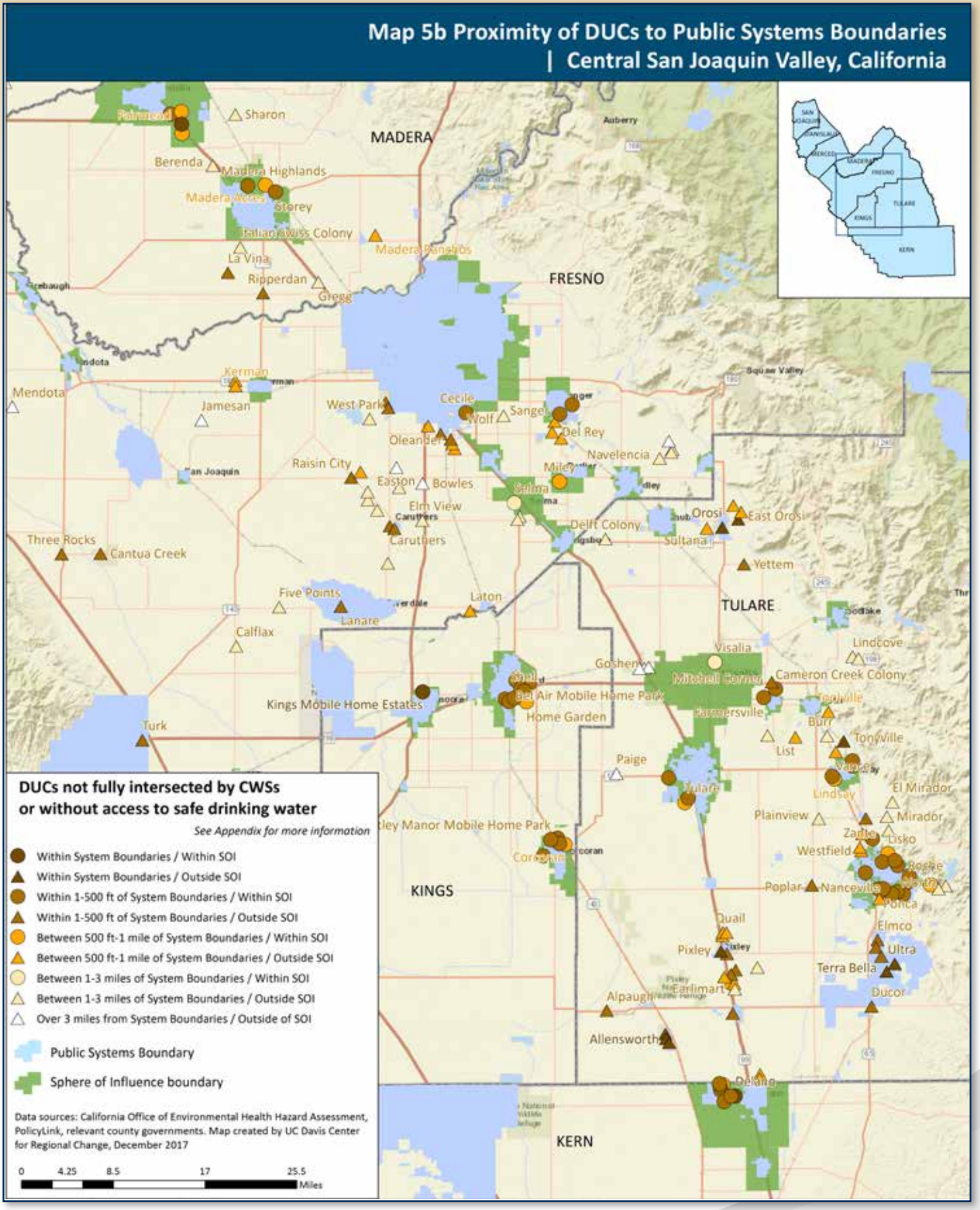
Map 5 Proximity of DUCs to In-Compliance Public Systems | San Joaquin Valley, California



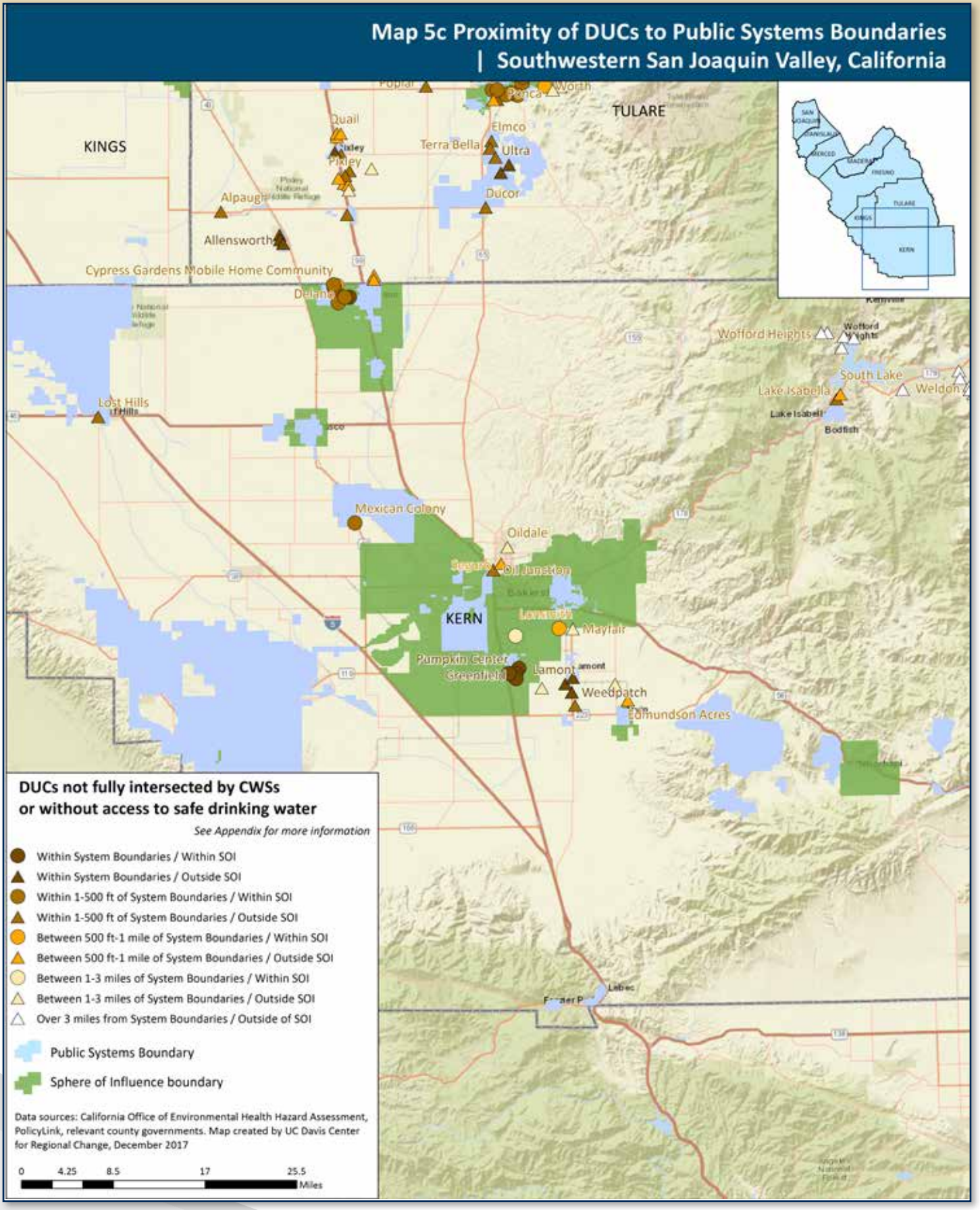
Map 5a Proximity of DUCs to Public Systems Boundaries | Northern San Joaquin Valley, California



Map 5b Proximity of DUCs to Public Systems Boundaries | Central San Joaquin Valley, California



Map 5c Proximity of DUCs to Public Systems Boundaries | Southwestern San Joaquin Valley, California



To explore the feasibility of connecting DUCs with nearby CWSs that are currently SDWA-compliant, we developed a least cost path analysis (see Appendices for more information about our methods). This analysis includes all 450 DUCs in the SJV, which, when aggregated by community name, become 222 DUC "clusters." This approach illustrates the shortest distance by road (path), thus indicating the least cost alignment from a cluster of DUCs to the nearest three CWSs. The summary table below only refers to the single closest in-compliance CWSs. A complete table listing the three closest CWSs to all 222 DUC clusters can be found in the Appendices.

Most CWS consolidations occur between systems that are within 3 miles of a nearby system (Interview 2017). As shown in Table 4, this suggests that the vast majority of the DUCs in the SJV (86% or 192) are good candidates for consolidation. Likewise, this suggests that arguments regarding the economic infeasibility of connecting DUCs to CWSs may be overstated.[9]

Table 4. Least Cost Path Analysis from a DUC to an In-Compliance CWS

Distance to Closest Safe Drinking Water Supplier within a 10-mile radius of each DUC	Number of DUCs	Percentage of DUCs
Less than 500 feet	148	67%
500 feet to 1 mile	19	9%
1 to 3 miles	25	11%
More than 3 Miles	24	11%
No safe water supplier within 10-mile radius	6	3%
Total	222	100%

V. POLICIES AND FUNDING MECHANISMS FOR SAFE DRINKING WATER IN DUCS

The goal of this section is to identify planning and policy practices that do and do not adequately address the needs of DUCs with respect to safe drinking water. To this end, we first examine existing policy tools, and then identify gaps in the current policy landscape. One of the important gaps we discuss here has to do with residents who are served by SSWSs that are less strictly regulated than CWSs, or who rely on private, domestic private wells.

A. Setting Priorities at the State Level

For close to 30 years, California state law has guaranteed the right to "pure and safe drinking water." However, this promise has yet to be fulfilled (Salcedo et al. 2013). Since California's Water Code first defined Disadvantaged Communities (DAC) in 2004, the state's Environmental Justice Framework has required identifying and engaging disadvantaged and disproportionately impacted communities with regard to water and other resource management decisions (Fresno County Local Agency Formation Commission 2015). However, the state did not have a formal definition of DUCs until the Planning for Disadvantaged Community Act (SB 244) passed in 2011 (California Legislative Senate 2011). California also became the first state to adopt a HRTW (AB 685), which proclaims that "every human being has the right to safe, clean, affordable and accessible water adequate for human consumption, cooking and sanitary purposes" (California Legislative. Assembly 2012). Henceforth, state agencies have had to consider the HRTW as they establish future policies and regulations.

Ensuring that the HRTW is realized in California requires multiple levels of intervention—from local system decisions, to those at the level of county and state. In some instances, state policies are designed to force or encourage local agency action. In other instances, the state offers support and solutions to communities directly. The SWRCB acknowledges that despite years of efforts, "much work…remains to be done to address

the Human Right to Water for customers of California's small PWSs that deliver water that does not meet standards" (SWRCB 2015, 141). Examples of state-level priority-setting policies include the following:

- **California Water Action Plan:** 2 of 10 actions focus on water in disadvantaged communities: Action 7 calls on public agencies *Provide Safe Water for All Communities*, and Action 2 highlights assistance for DACs in the context of regional water management (California Natural Resources Agency [CalNRA] et al. 2014).

- **Californians without Safe Water and Sanitation:** This report outlined 14 recommendations to further actualize the HRTW. The first recommendation in the report (that an estimate be made of the statewide total population without safe water) has not been enacted for Californians not served by a CWS (California Department of Water Resources [DWR] 2014).

- **Safe Drinking Water Plan for California:** This plan places the onus of action for DUCs on local agencies, including: county and city planning departments, Local Agency Formation Commissions (LAFCOs), and county DEHs. Local agencies are expected to identify unincorporated areas, consider whether new systems are needed, and suggest means by which communities can access funding or pursue consolidation. Much of the burden for improving service also remains on the communities working with their local agencies for long-term solutions (SWRCB 2015b).

B. Policies to Influence Local Priorities

The Planning for Disadvantaged Community Act (SB 244) requires local agencies to assess and address the social, economic and environmental conditions of DUCs within their jurisdiction (California Legislative Senate 2011). This bill defines DUCs in the Government Code, and requires general plans to be updated to address the infrastructure needs in DUCs. In addition to mapping DUCs, local agencies must also appraise each DUC for the seven essential general plan elements: land use, circulation, housing, conservation, open space, noise, and safety. The updated general plans must include: analyses of current efforts to mitigate inequities in DUCs; analyses of barriers to overcoming those inequities; and an evaluation for potential annexation. Finally, cities and counties must include an implementation plan, as well as evaluation metrics to quantify progress.

In the SJV, nine large cities have identified and assessed DUCs in their jurisdictions.[10] These assessments disclose whether DUCs receive drinking water from a CWS, and the specific CWSs from which they receive drinking water. Based on a review of county-level DUC assessments, all the counties have undertaken some level of analysis in compliance with SB 244, and all but Fresno County have inventoried drinking water services and sewer services in DUCs. However, as of February 2018, the required implementation plans to resolve deficiencies and barriers remained unspecified (see the Appendices for a review of SB 244's implementation). The results of the spatial analysis presented earlier in this report suggest that publicly available, statewide data sets exist, and that local agencies can use them to initially review which DUCs have access to existing CWS infrastructure, and pinpoint where that infrastructure is delivering unsafe water based on CWS compliance status.

The SWRCB took over management of the state's Drinking Water Division from the California Department of Public Health in 2014. Since then, at least four pieces of legislation have given the SWRCB the authority to actively work toward safe drinking water for all. In 2015, the legislature passed the Mandatory Consolidation or Extension of Service for Disadvantaged Communities bill (SB 88) (California Legislative Senate 2015). As of January 2015, the SWRCB can require water systems that are out of compliance with the SDWA to consolidate with, or receive an extension of service from, a nearby system (California Legislative Senate 2015). Furthermore,

Water AB 92 established the SWRCB's Office of Sustainable Water Solutions to assist small water systems and DACS with technical assistance, funding agreements, and relationships for consolidation (California Legislative Assembly 2015a). In 2016, SB 552 revised SB 88 to update "disadvantaged communities" to include Mobile Home Parks, even if they are not in unincorporated areas or served by a mutual water company (California Legislative Senate 2016a).[11] This latest bill also empowered the SWRCB to hire third-party administrators to manage out-of-compliance water systems.

In 2016, the Public Water System Permits bill (SB 1263) gave the SWRCB a revised Public Water System (PWS) permitting process that forces new systems to negotiate consolidation or service solutions with existing, capable nearby PWSs (California Legislative Senate 2016b). The overarching goal of this bill is to discourage the proliferation of new water systems that are near existing systems and lack adequate, long-term supplies. It encourages the consolidation of systems based upon technical, managerial, and financial (TMF) capacities. This bill does not address the need for unincorporated communities to improve their existing systems or establish new ones. One state water agency interviewee stated that "lots of water systems [were] built in rural areas that shouldn't have been built," and heralded this bill as a safeguard against future "unsustainable" systems.

Making water affordable is a critical goal of achieving the HRTW in California. The Low-Income Water Rate Assistance Program (AB 401) requires the state to develop a plan for funding and implementing a Low-Income Water Rate Assistance Program (California Legislative Assembly 2015b). However, despite spending billions to subsidize energy, telecommunications and other services for low-income residents, the state lacks a parallel program for drinking water services (SWRCB 2017f). More than half the state's population is served by water systems without a rate-assistance program. The SWRCB is drafting a report on the feasibility, financial stability, and designed program structure of such a program.

Progress on Consolidations to Date

Consolidations can be physical or managerial. While the state continues to encourage voluntary consolidations, SB 88 and SB 552 enable the SWRCB to force consolidation wherever local agencies are not acting. According to one technical assistance non-profit staff person interviewed, SB 88 and SB 552 "were a major step forward... in saying to local governments that 'you can't ignore these folks and not give them access to potable water.'" Another interviewee stated that the bills have encouraged incorporated communities to rethink their past decisions to exclude unincorporated areas.

Ultimately, some of these communities and water systems would rather "do things on their own" in the form of voluntary consolidations, rather than have the state force their decisions. The bills mention service extension to private well owners, which is common in DUCs, but the state does not have the same authority to force service extension to these households. It can however, incentivize it. The ability to promote and implement consolidations in private well communities would help close an important regulatory gap.

The SWRCB is encouraging and incentivizing voluntary consolidations. In the first half of 2017, it identified 12 different voluntary consolidations in the SJV (of 32 total statewide), 11 of which were privately funded or self-funded. Most of these consolidations were driven by water quality issues and violations, but two were driven water shortages (SWRCB 2017c). The SWRCB published a list identifying future DAC-specific consolidation projects, including 30 in the SJV. The majority (20) of these are, on average, less than a mile from the anticipated receiving system. The SWRCB, under its SB 88 authority, issued initial letters for 11 potential consolidations as of 12/2017 (SWRCB 2018b). Statewide, the only mandatory compliance order was issued in 2015 to the City of Tulare and the Pratt Mutual Water Company; the latter company served Matheny Tract, a community inhabited by a predominantly disadvantaged Latino population (see Long-term Success Stories below for an in-depth discussion).

C. Funding Programs for DUC Water Systems and Households

DUC water systems and households require sufficient and reliable funding support to ensure access to safe, clean and affordable drinking water. However, they face a variety of funding challenges that, as of today, seem to preclude universal access to safe, clean and affordable drinking water in California. For years, the SWRCB and safe drinking water advocacy organizations have called on the legislature to enact a sustainable funding source to address longstanding gaps in funding for drinking water needs (SWRCB 2013). The most significant of these gaps is the lack of funds to help disadvantaged communities afford the operations and maintenance (O&M) costs associated with operating drinking water treatment facilities.

The legislature is currently considering the Safe and Affordable Drinking Water Fund (SB 623). This would create a fund to address precisely such gaps in drinking water funding, and generate a new long-term source of funding, to be raised from a combination of increases to existing fees, and new fees (California Legislative Senate 2017). The California Governor's Proposed 2018-2019 State Budget, released in January 2018, proposes $4.7 million in funding for the State Water Board and the California Department of Food and Agriculture to start up the fund. According to language in the proposed budget, these funds will be utilized for "(1) developing and implementing fee collection systems, (2) conducting an assessment to estimate the level of funding needed to assist water systems in the state to ensure the delivery of safe and affordable drinking water, and (3) developing and making available a map of high-risk aquifers used as drinking water sources" (California Governor's Office 2018, 100).

The inclusion of this startup support for the Safe and Affordable Drinking Water Fund supports the policy proposed in SB 623, and signals the governor's endorsement of the proposed legislation. However, enacting the legislation still requires a two-thirds vote by the legislature, which has not yet taken place as of January 2018. Unless and until a long-term source of funding is secured along the lines of what is proposed by SB 623, hundreds of California communities will continue to be unable to afford safe drinking water for their residents—making this a matter of great urgency. The outcome of these decisions will shape the landscape of safe drinking water access in California for years to come.

While some level of public funding has recently been provided to disadvantaged communities in need of access to clean drinking water and consolidation and interconnection efforts, much of this has been in the form of one-time, temporary or emergency assistance. During the recent, historic drought, the state appropriated $224M for drinking water infrastructure, and more than $60M for emergency drinking water responses for drought-stricken disadvantaged communities (California Legislative Analyst's Office 2016). In 2017-2018, an additional $28.5M was allocated in the state budget to address lingering drought impacts, including $6.5M to finance the continued provision of emergency drinking water supplies (bottled and hauled), and $17M in grants for long-term, permanent safe drinking water solutions (California Legislative Analyst's Office 2017). Many of these impacted communities already faced drinking water challenges before the drought, such as contaminated water, or the inability to afford drinking water treatment O&M costs. Resolving these challenges will require funding for long-term drinking water solutions, not just temporary emergency drought assistance.

With the creation of the SWRCB's Office of Sustainable Water Solutions, there are now staff members whose express purpose is to help DACs access SWRCB technical and financial resources. The SWRCB also enacted reforms in 2016 in order to streamline the delivery of critical drinking-water infrastructure funding from the Drinking Water State Revolving Funds (SRF).[12] The State Board's Intended Use funding plan suggests that it is "feasible to completely finance all" the complete application requests from disadvantaged communities under its Small Community Grant fund. Meanwhile, the SWRCB's Division of Financial Assistance states that its "first priority will continue to be financing disadvantaged communities" (SWRCB 2017b, 4-5; California Legislative

Analyst's Office, 2016). In the same vein, in 2016, the California Department of Water Resources (DWR) and the Water Board brought together representatives of disadvantaged communities and tribes to prioritize key challenges, and provide input to the development and rollout of the agencies' Proposition (Prop) 1 funding programs. Prop 1 Funds are mostly low-interest loans, and DACs and Severely Disadvantaged Communities (SDACs) are eligible for grants. Additional Prop 1 funding exists for Technical Assistance providers to work with DACs and tribes in the development of Prop 1-eligible projects (California Natural Resources Agency 2017). Additionally, in 2016, DWR awarded $232 million in grant money to fund 130 projects, and solicited proposals with plans to award over $50 million in early 2017, and another $50 million or more in subsequent years.

Finally, in 2016 and 2017, the state made several million dollars available to assist private well owners and < 15 Service Connection (SC) systems facing drought-related supply and quality emergencies. It has also provided nonprofits with access to grants to drill new or deeper wells, or repair existing wells (although these private well funds are not enough to address the ongoing need). Overall, the more these existing funding sources can be directed toward communities and households with the greatest needs—like DUC communities and households—the more California is likely to achieve the promise set out in its HRTW Law.

D. Summary of Funding Policy Challenges

Ability to Pay

Current funding programs are focused on capital improvements, namely major infrastructure upgrades or the development of new supply sources. While many of these funds are available through low-interest loans, systems still need the means to repay these loans. Traditional water system revenue generation tools that make it possible to self-finance investments of this nature, such as rate increases, benefit assessments, or special taxes or bond debts, are unavailable to many small systems that serve DUCs. This creates a dependence on external funding, including many sources which may be temporary and are not guaranteed. Reliance on very competitive, and thus uncertain, state and federal funding mechanisms puts DUCs in a precarious position that cuts against long-term planning and sustainable solutions.

Financing for Operations and Management

Because of a long-standing emphasis in state and federal programs on providing capital improvements, it is very difficult to find funding for O&M. Even when O&M financing is available, it is often sourced from the state's General Fund, and is therefore subject to political and economic trends, reducing the certainty needed to ensure high-quality and reliable service.

The arsenic treatment plant of the City of Lanare in Fresno County is commonly cited as an example of why stable, long-term O&M financing is critical. After just six months of operation, Lanare was forced to shut down its state-of-the-art (and multi-million dollar) arsenic treatment systems because of residents' inability to pay the level of rates required to keep the plant running. Residents are still paying off the debt of the plant, without being able to operate it, and have returned to using water with arsenic levels above the MCL limit (Safe Water Alliance et al. 2014).

A diverse coalition of organizations from the water justice, health, and agricultural sectors have been working to advocate for the passage of SB 623, which would create a long-term, sustainable funding source for small systems' O&M. The SWRCB also anticipates being able to use the administrative process gained via SB 522 (which enables the SWRCB to contract with outside entities to serve in a role similar to that of receivership) to act as a mechanism through which to administer O&M funding (SWRCB 2017m).

Still, a new funding source cannot fix everything without additional support to build technical and managerial capacity. As noted by reporters in a summer 2017 public radio feature, "this fund wouldn't solve the drinking water problem for everyone. [...] communities like Lanare face more obstacles than money: they're small, remote, tend to have a lot of Spanish speakers, and they're run by volunteer water boards" (Romero and Klein 2017). This limited funding for O&M is a major reason why California needs programs like Prop 1 Technical Assistance for DACs, as well as the Safe Drinking Water Fund.

Affordability

Issues of water affordability, especially for those relying on drinking water from non-compliant water systems, constitute a longstanding burden for California households. A 2011 report found that water-related expenses were close to an average of 4.1% of household income for customers of four community water systems in the SJV with nitrate violations (1.5% is the U.S. EPA's water affordability threshold). In the SJV, most households (95%) typically spend more than 1.5% of their income on water (Moore et al. 2011). A 2013 report shed light on this issue as well, investigating water affordability in the Tulare Lake Basin (Fresno, Tulare, and Kings Counties), with findings informed by survey responses from 51 water systems. The authors defined affordability as spending < 2% of household income on drinking water; they found that more than one third of the households in their study sample were spending more than this threshold on drinking water services (Christian-Smith et al. 2013). When accounting for the replacement costs of water (i.e., purchasing bottled or vended water, or buying water filters to ensure safety), unaffordability is an even larger problem: close to 50% of households in the study area were spending more than 2% of household income on drinking water (Christian-Smith et al. 2013).

VI. LONG-TERM SOLUTIONS: SUCCESS STORIES

The policies and programs described in previous chapters of this report are part of a growing effort to address the lack of drinking water service provision to DUCs in the SJV. This section explores three success stories. Here, informed by document review and interviews, we examine specific cases in Kings County and Tulare County where funding and policy programs have been successfully implemented to improve drinking water access in DUCs. Our analysis of these cases is accompanied by "community maps" that illustrate the challenges and opportunities that come with providing clean and reliable drinking water supplies to these particular DUCs. Each map identifies the location of the DUCs, CWSs and SSWSs; the status of the CWSs (in compliance, returned to compliance, or out of compliance); and the closest and least cost path from a DUC to an in-compliance CWS.

These cases highlight how advocacy efforts by environmental and water justice organizations helped create new state policies and funding sources, with a clear and positive community impact. Financial and political intervention by the state in turn helped to effectively implement long-term solutions. These are examples of promising steps toward a sustainable and just water system for SJV DUCs.

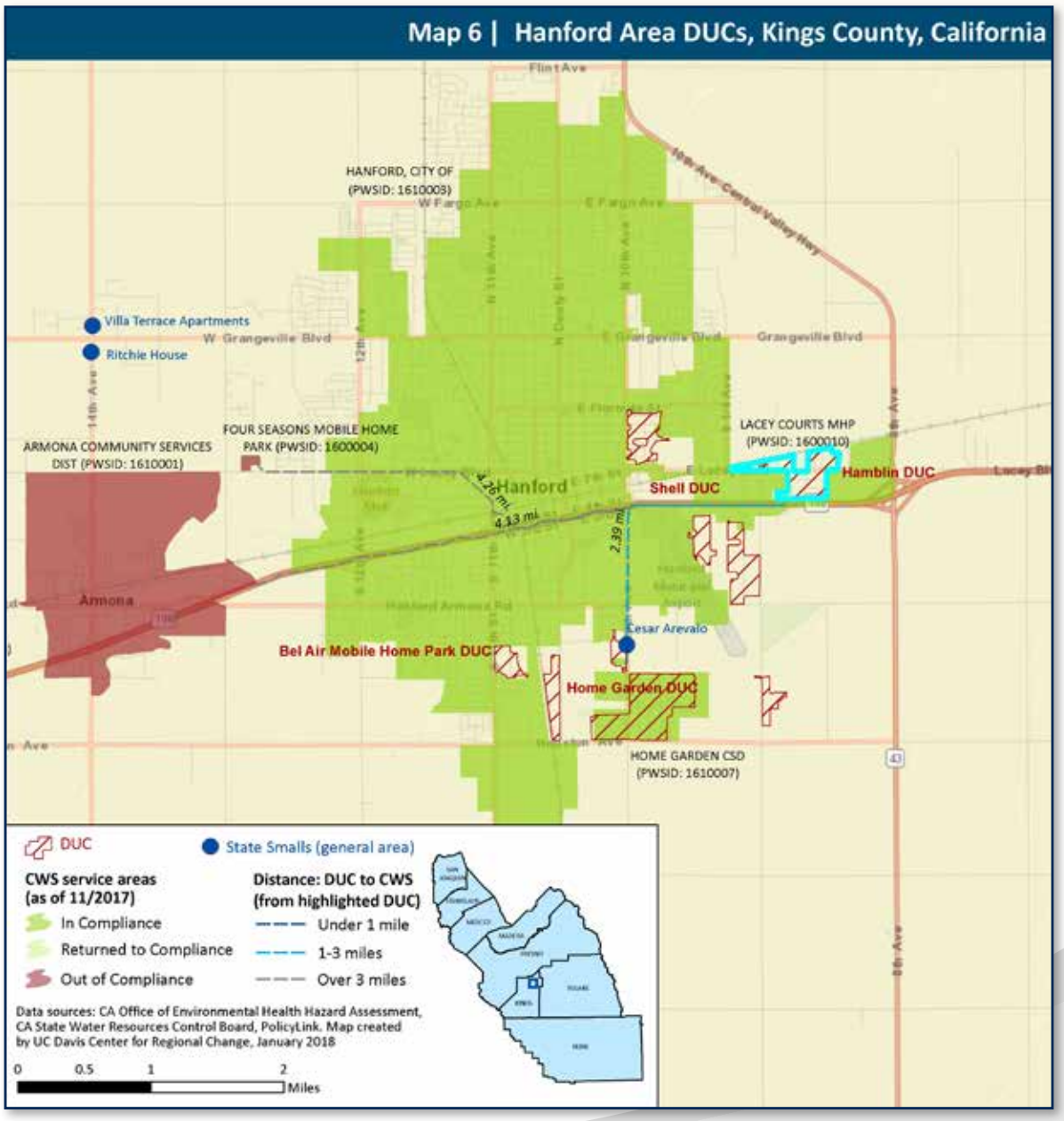
A. Shell, Hamblin and the City of Hanford: Voluntary Consolidation in Kings County

The Kings County's updated 2035 General Plan identifies four DUCs: Armona, Home Garden, Kettleman City, and Stratford.[13] Until recently, Shell and Hamblin were also DUCs. Each of the small systems in Shell and Hamblin had chronic arsenic MCL violations, and in September 2014, during the drought, the Hamblin Subdivision's shallow well went dry (SWRCB, 2017a). Kings County Emergency Services supplied emergency bottled water to the community, and emergency Prop 84 drought allocation funding enabled a temporary fix for this long- standing issue. A temporary intertie connected Hanford and Hamblin, but all parties recognized that a permanent line was needed between these two systems. Fortunately for these communities, the three small CWSs that supplied them with water (Four Seasons Mobile Home Park, Lacey Courts Mobile Home Park, and Hamblin Subdivision Mutual Water Company) were consolidated with the City of Hanford's system as part

of the Hanford Regional Consolidation Project (Kings County, n.d.). After receiving an initial planning grant in 2011, in August 2014, the City of Hanford was awarded a Proposition 84 grant for $4 million to help fund the consolidation that resulted in four new water mains serving Hamblin.[14]

In the end, however, a consolidation project obtaining full participation from the Hamblin MWC posed a challenge. Before the funding agreement was reached, only 31 of the 41 shareholders agreed to sign the Consolidation and Water Service Agreement with the City of Hanford. However, during construction of the new water mains, the remaining MWC members agreed to participate in the consolidation. Accordingly, construction started in late 2014, and by November 2015, all three water systems were fully consolidated with the city, and were receiving safe drinking water.

This case is encouraging because it shows a community voluntarily consolidating water systems with help from Proposition 84 funding to improve safe drinking water access in DUCs. These enabling conditions were made possible through the SWRCB's compliance orders and thanks to the fact that the City of Hanford, in consultation with the MWCs, determined that consolidation was the most cost-effective, long-term solution.



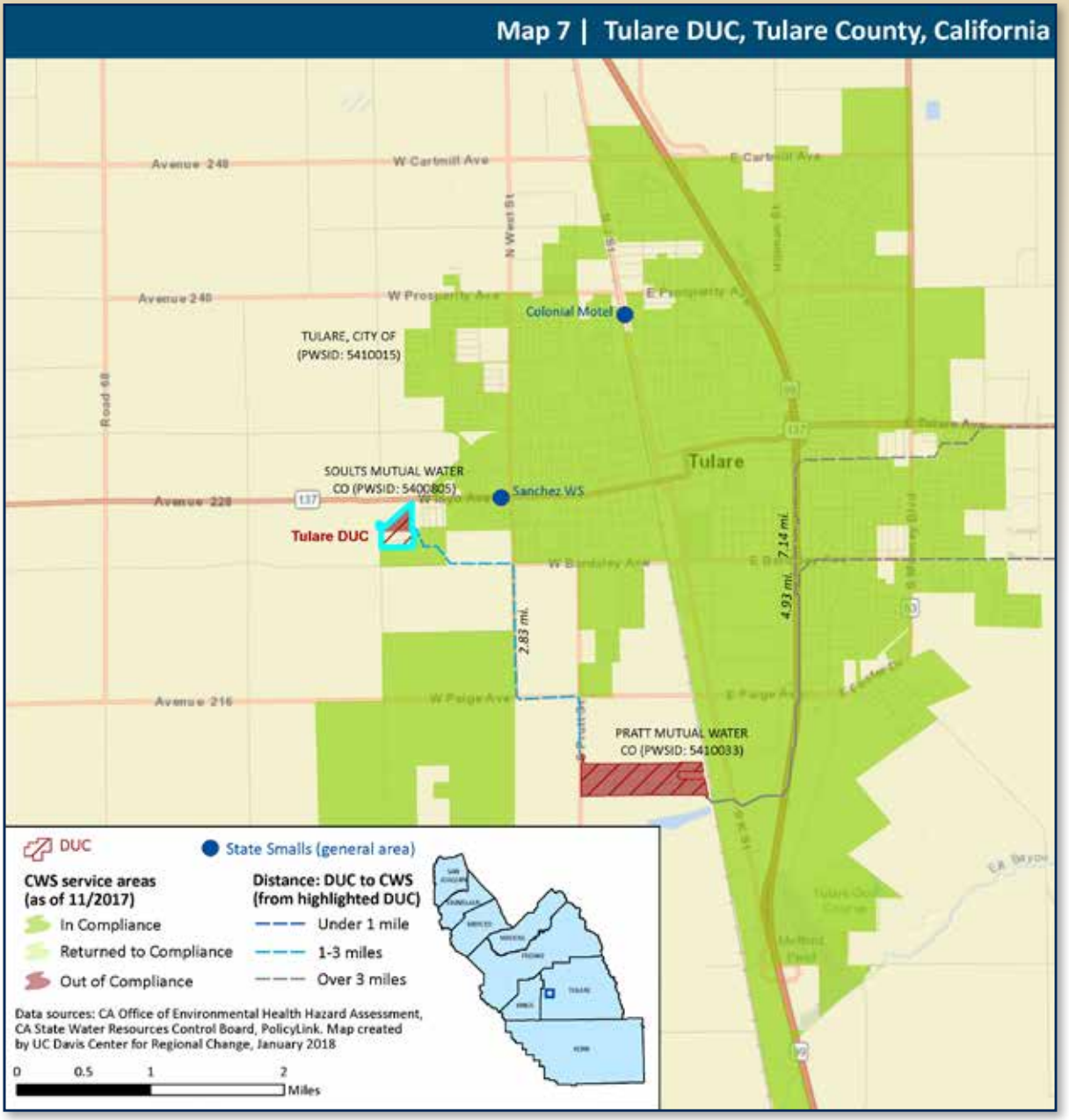
B. The City of Tulare and Matheny Tract: SB 88 Implementation in Tulare County

The state first used its mandatory consolidation authority under SB 88 to order a consolidation between the City of Tulare and Matheny Tract in DUC of 1,500 within the city's SOI (SWRCB 2017k; Tulare County LAFCO 2013).[15] Prior to consolidation, Matheny Tract was served by the Pratt Mutual Water Company's (MWC) two-well system, which had provided water contaminated with high levels of arsenic for years, if not decades. Pratt MWC, in partnership with the community-based Matheny Tract Committee, negotiated with the SWRCB and the City of Tulare for expeditious consolidation, to cap off years of organizing and litigation. The order stated that the consolidation with Tulare's water system must be complete by June 2016 (SWRCB 2017k).

The City of Tulare first agreed to connect to Matheny Tract in March 2009 (California Association Local Agency Formation Commission [CALAFCO] 2017), and the Matheny Tract Committee negotiated a further agreement with the city pursuant to an annexation in 2010. In 2014, the state invested $4.8 million of Proposition 84 funding to install a water main between the city and the MWC—a connection which initially presupposed that the city would deliver its water to the community (Griswold, 2016). However, the city reneged on its agreement to consolidate with the MWC, and sought to disavow the 2009 contract through litigation filed against Pratt Mutual and the Matheny Tract Committee in 2015 (Griswold, 2016; CALAFCO 2017). Pratt Mutual and the Matheny Tract Committee, represented by Leadership Counsel for Justice and Accountability, countersued the City of Tulare to enforce the contract as written (Griswold, 2015). The lawsuit was settled upon completion of the consolidation in June 2016.

In June 2016, project partners began installing water meters. With the opening of the water main, efforts to connect and consolidate the two water systems had finally succeeded. The state then initiated the SB 88 consolidation process with Matheny Tract's neighbor, Soults Tract, at the same time as it proceeded with the Pratt Mutual consolidation. The SWRCB issued a pre-consolidation letter to the City of Tulare encouraging voluntary consolidation with Soults MWC, another system with long-standing nitrates violations that was also within the city's SOI (SWRCB 2013; Castillo, 2016). Presently, the system supplies clean drinking water to more than 350 homes in Matheny Tract and 35 connections in Soults Tract (Hernandez 2016).

As of February 2018, this was the only case of completed implementation of SB 88, and demonstrates how the new law can be an important policy tool for the state to enable consolidation and provide clean drinking water to DUCs. It also shows the effectiveness of using diverse strategies, from creating collaborative partnerships, to threatening state-mandated consolidation, to making financial incentives available to receiving water systems. Used together, these efforts can encourage more consolidations between water systems serving DUCs.


Map 7 | Tulare DUC, Tulare County, California
Avenue 248
W Cartmill Ave
E Cartmill Ave
N West St
Avenue 240
W Prosperity Ave
E Prosperity Ave
Colonial Motel
TULARE, CITY OF
(PWSID: 5410015)
Road 68
Tulare
SOULTS MUTUAL WATER
CO (PWSID: 5400805)
Avenue 228
137
Sanchez WS
Tulare DUC
W Bardsley Ave
7.14 mi.
4.93 mi.
2.83 mi.
Avenue 216
W Paige Ave
E Paige Ave
Pratt St
PRATT MUTUAL WATER
CO (PWSID: 5410033)
99
DUC
State Smalls (general area)
CWS service areas
(as of 11/2017)
In Compliance
Returned to Compliance
Out of Compliance
Distance: DUC to CWS
(from highlighted DUC)
Under 1 mile
1-3 miles
Over 3 miles
Data sources: CA Office of Environmental Health Hazard Assessment, CA State Water Resources Control Board, PolicyLink. Map created by UC Davis Center for Regional Change, January 2018
0
0.5
1
2
Miles

C. East Porterville: Drought Emergency and Municipal Service Extension

East Porterville, located in Tulare County, is a predominantly low-income Latino community of approximately 7,500 residents, who are reliant on private wells. The nearby City of Porterville's SOI includes 12 unincorporated communities, including parts of East Porterville. In their 2014 municipal service review update, the city and county proposed that Porterville add most of East Porterville into the SOI, and further recommended that the rest of East Porterville be included as a "community of interest," and therefore a candidate for annexation.

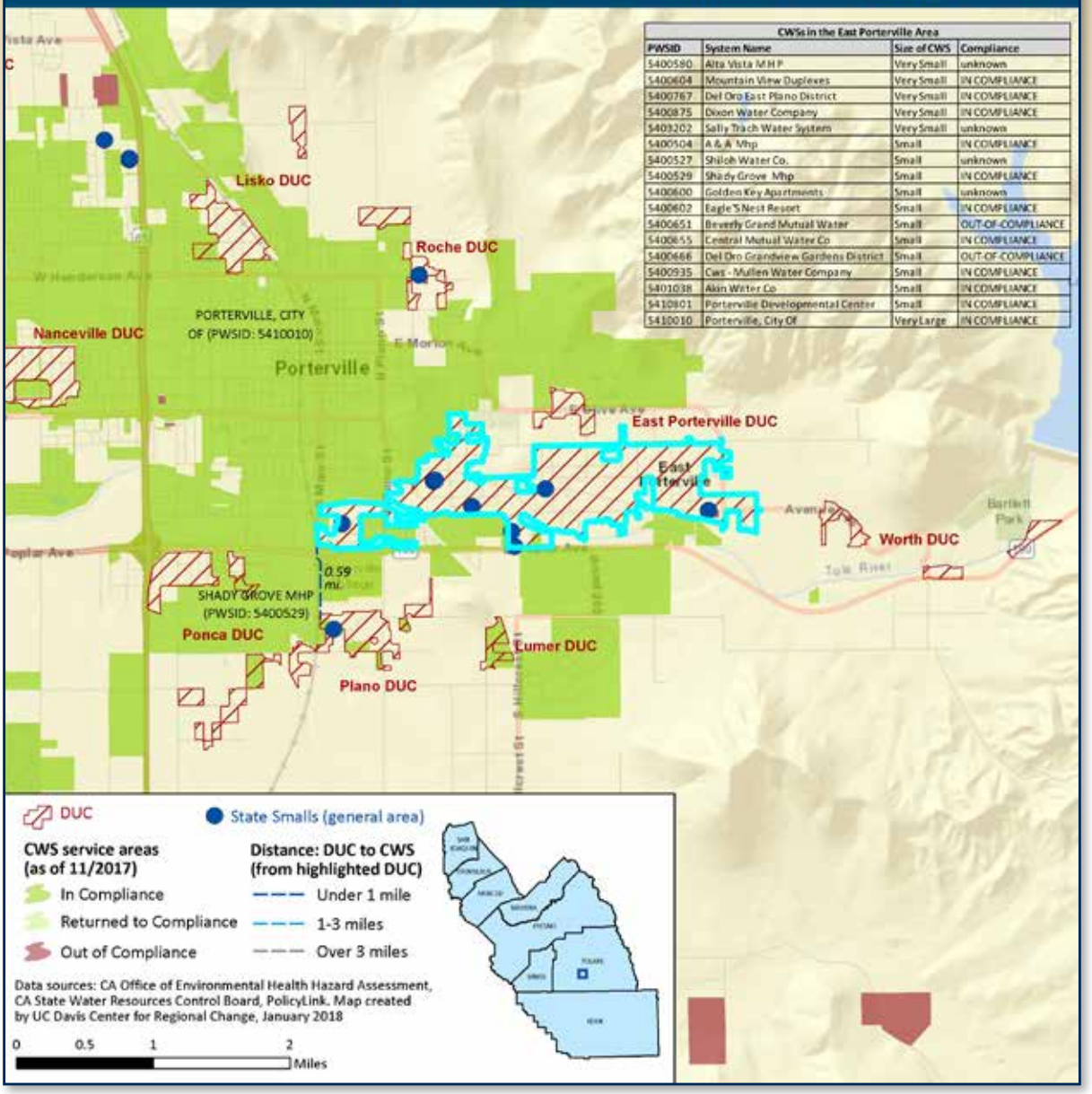
During the summer months of 2014, an estimated 300 wells in East Porterville went dry, and many other wells were suspected to have been contaminated with unsafe levels of nitrates. While private well testing began in 2015, nitrate contamination had been an issue since the 1970s, largely due to failing septic systems. Toward the end of the drought in late 2016, an estimated 1,600 domestic wells experienced outages in Tulare County. As many as 500 of these were estimated to be located in East Porterville (Tulare County, 2017; Interview, 2017).

Through the state-funded Household Tank Program, 176 properties received household water tanks. These were refilled weekly by water haulers who were contracted by the Tulare County Office of Emergency Services (OES) (DWR, 2016b; Interview 2017). The East Porterville Water Supply Project aimed to connect up to 1,300 homes by the end of 2017 (DWR, 2016a). As of March 2017, 756 properties in East Porterville signed Extraterritorial Service Agreements (ESAs) with the City of Porterville to receive water service with 341 property owners either not responding, or opting out of connecting, thus preferring to keep their domestic wells (Interview, 2017). By May 2017, all but 64 of the 756 property owners had completed the final step of opening a utility account, with the rest signing up by the end of the summer (Interview, 2017).

The project is now on track to meet the goal of connecting all 756 properties (including approximately 1,200 households) to the Porterville system before the end of February 2018. Tomás García, a water justice advocate working with the Community Water Center, helped to organize the community-based organization *East Porterville for Water Justice*. Additionally, the Leadership Counsel for Justice and Accountability has been working with East Porterville, as well as Seville and Visalia, lobbying for funding and legislative action (Griswold, 2017). However, while it is encouraging that the city aims to incorporate the whole community in the future, it does not have a secure timetable to do so. The county also did not recommend fully annexing East Porterville into Porterville.

This case shows the importance of community advocacy in providing assistance and resources to find funding, and to convince councils to actually supply clean drinking water to these DUCs. Although it took a drought for the city, regional and state agencies to step in and provide water access for East Porterville, this case can serve as an example to other cities and counties, to encourage them to take early preventive measures to avoid water access problems.

Map 8 | East Porterville Area DUCs, Tulare County, California



VII. RECOMMENDATIONS

This report has sought to identify the challenges facing residents of SJV DUCs in accessing clean drinking water, and to inform the actions of community advocates, policymakers, and regulators who seek to improve conditions in these vulnerable areas. It has built upon earlier studies (e.g., Flegal et al. 2013) to develop a powerful methodology for mapping and analyzing conditions in SJV DUCs on a local and regional scale. It has also provided a review of current public policies that have achieved, or have the potential to facilitate, crucial improvements in the lives of the valley's DUC residents.

DUCs clearly face multiple economic, political, social, and environmental challenges. Many of these have been years and decades in the making, and will likely require long-term and sustained effort to change. Likewise, many of these problems are the product not only of technical or funding gaps, but also of entrenched political and economic systems. However, while these challenges might appear insurmountable, there are, in fact, many possible solutions that can improve conditions for local residents in meaningful ways.

Here, to conclude, we present a set of problems identified by the research and recommendations—some immediately achievable, and some aspirational—to address these problems of water injustice in DUCs.

Problem 1: Tens of thousands of DUC residents lack access to safe drinking water despite their proximity to drinking water systems that can provide a sustainable source of safe drinking water.

Recommendation 1: Develop and strengthen consolidation and service extension mandates and incentives.

As shown in the study's Maps 1, 4 and 5, and in the least cost path analysis, the potential for the vast majority of DUCs to physically connect or consolidate with cities and larger safe drinking water supplies is much greater than commonly represented by local governments and state agencies.

- Drinking water policies and programs must not only focus on improving the operations of existing CWSs in their current system boundaries, but also on extending services to communities that are not currently served by CWSs.

- The authority granted to the SWRCB to compel consolidations and extensions should be expanded. For example, state law should clarify that the board may use its authority to extend services to DUC residents who receive residential water from SSWSs and private wells.

- A potential mechanism for expanding the reach and effectiveness of the law would be to allow communities without safe drinking water to petition the state to consider ordering consolidations.

- State and local policies should create incentive structures that encourage cities and large water and wastewater systems to provide service to proximate DUCs that have unsafe water or inadequate wastewater service. For example, local or state policies could require service provision to communities lacking safe drinking water prior to approving service extension for new development within a jurisdiction where households lack safe and reliable water service.

- For DUCs that are not proximate to safe drinking water supplies, the SWRCB should consider other non-physical-plant forms of consolidation (e.g., joint system administration or maintenance) that may allow unsafe drinking water systems to achieve economies of scale.

Problem 2: Public policies for funding safe drinking water in the SJV's DUCs are not coordinated, and do not address the small and historically under-resourced water systems that prevent access to safe drinking water.

Recommendation 2a: Create larger, more stable, more equitably distributed and coordinated sources of funding that focus on addressing historic patterns of inequitable access to resources.

- Long-term funding solutions and strategies must account for the historic and systemic factors that have disadvantaged low-income people and people of color through social and economic exclusion from settlement and employment opportunities.

- Provide new, diverse and reliable funding sources to develop, implement, and support sustainable and affordable solutions, including consolidations and service extensions, on a scale necessary to redress widespread disparities in drinking water access.

- Create a portfolio of ongoing funding sources that can provide a stable revenue stream to develop and maintain sustainable and affordable solutions that address the unmet needs of SJV DUCs (e.g., support for technical assistance, planning, as well as capital, treatment, and O&M costs). Current legislation proposes a statewide Safe and Affordable Drinking Water Fund for this purpose.

Recommendation 2b: Ensure that local governments comply with land use and annexation laws to address the legacies of discriminatory local planning practices.

- SB 244 (government code sections 56430, 56425, 65302.10) is a critical tool for this purpose. The state legislature must enforce SB 244's requirements for cities and counties to assess the infrastructure needs of DUCs in city general plans, and for LAFCOs to identify and characterize the location and characteristics of any disadvantaged unincorporated communities within, or contiguous to, a sphere of influence.

- LAFCOs must condition certain annexations to prevent development patterns that exclude DUCs. Additional mechanisms could include: requiring that all existing, neighborhoods within 1,000 feet of a service provider have adequate services prior to the extension of services for new development; or making state investments to local agencies conditional, based on the extent to which they have secured basic services to communities in their jurisdictions.

- Policy makers and community advocates could consider whether land use decisions that produce a negative and disparate impact on access to services for communities of color are in keeping with state and federal fair housing and civil rights laws, applying these laws, or litigating on their behalf, as appropriate.

Problem 3: Lack of public access to data and limited coordination of state data tools obscure the historic and systemic factors that drive racial and ethnic inequality in access to safe drinking water.

Recommendation 3a: Improve public access to data and planning tools, enhance existing data systems, and coordinate monitoring systems efforts.

- State agencies must improve public access to data and planning tools to inform strategies and craft policies that improve conditions in DUCs throughout the state. State agencies must also consolidate and align their data systems.

- A dataset that merges the SWRCB's drinking water source data with the DWR's multiple datasets (e.g., DRINC, PDWW, EAR, Conservation Reporting) as well as data from across DWR's various platforms, like the Urban Suppliers/Urban Water Management Plan (UWMPs), Well Completion Reports, Groundwater Information Center (GIC) and others.

- The Department of Public Health's Environmental Health Tracking Program's water system boundary tool would provide more accurate, comprehensive, and targeted information for unsafe drinking water systems. This unified dataset should also more effectively utilize drinking water indicator data layers from the CalEnviroScreen 3.0.

- The SWRCB must improve access to, and the consistency of, state monitoring, reporting and tracking for systems with fewer than 200 connections. In addition, a monitoring program for private wells would be important to address this gap in state information and regulation.

Recommendation 3b: Develop new publicly accessible data and mapping tools to improve local and regional planning.

- The State should continue to develop a publicly accessible Human Right to Water indicator and/or tracking tool that can help local and state actors identify the challenges facing DUCs in realizing areas facing different kinds of challenges related to this right.

- Make publicly accessible maps of preK-12 schools served by CWSs, as well as any lead testing and other water quality data from school sites.

- The DWR and SWRCB should develop a statewide vulnerability tool that builds off the data and methodologies in this report, and collects and improves data on SSWSs and domestic wells, to identify community vulnerability to water supply shortages and poor water quality.

- The Governor's Office of Planning and Research should adapt the report's methodologies to create a statewide DUC map to inform local and statewide planning and investment priorities for those communities.

Recommendation 3c: Address Outstanding Research Needs

Further research and analysis is needed to build on the findings in this report to better understand and address disparities in access to clean and safe drinking water. Priority research should include the following topics.

- Refine the Least Cost Pathway analysis in this report based on ground-truthed CWS boundary and distribution data (i.e., reporting on the actual provision of water, and not only the intersection of CWSs and given community boundaries).

- Conduct research on the potential for regional consolidation of small communities not located near large CWSs. The least cost path analysis used in the report can serve as the basis for this strategy.

- Include waste water and sanitation services in the analysis of how to provide crucial water infrastructure to DUCs.

- Draw on a new data set on private well water quality to conduct study of the water quality available to well-dependent residents.

Endnotes

1 A Community Water System (CWS) is public water system that serves at least 15 service connections used by yearlong residents, or regularly serves at least 25 year-long residents of the area. A State Small Water Systems (SSWS) provides piped water to the public for human consumption; it has at least five but no more than 14 service connections.

2 The remaining 10% have an undetermined or null status.

3 See page 15 for definition of CWS size classes.

4 This assumption may lead to the over-counting of populations not served by CWSs, depending on service area/boundary accuracy. In the absence of more robust boundary data, we do not know for certain the extent to which DUCs that are partially intersected by CWSs are, in fact, served by those water systems. For example, comparing state datasets, we identify 24 CWSs without a mapped service area. Of these, one is large (serving a population of 12,427); 1 is medium-size (serving a population of 8,965); and 22 are small (serving a population of 4,537). This suggests that there are approximately 26,000 people served by CWSs who are not included in our spatial analysis, some of whom may live in DUCs.

5 SSWS data included in this study is limited by what counties collect, and what they shared with the report authors. Some are missing location information, while others are missing population information. More accurate population and service area information for SSWSs is needed to know how many more residents get water from an SSWS compared to self-supplying with a domestic well. This would be an important direction for future research.

6 The remaining 6 CWSs serving DUCs include 1 small 'mixed' ownership CWS, and 5 of unknown ownership type.

7 Across all CWSs in the SJV, 465 are in compliance (70%), 49 have returned to compliance (7%), 140 are out of compliance (21%), and 13 (2%) have a null value or no known status.

8 Assessing MHI is challenging in DUCs, because U.S. Census income data is reliably provided only at the Census Tract or Block Group levels, which are much larger than most DUCS, and thus cannot provide an accurate assessment of income for residents in these small population areas. Often this results in an over-estimation of income in DUCs. Time and cost-intensive MHI surveys have been conducted in a small number of SJV DUCs, but data is lacking for the vast majority of them. (See Appendices for a representation of the MHI data for a selection of DUCs.) Valley DUCs, but data is lacking for vast majority of them. (See Appendices for a representation of the MHI data for a selection of DUCs.)

9 For 40 of the 222 DUC clusters analyzed, the closest CWS is out of compliance with the SDWA. This points to the need for focused investments in improved water quality treatment and distribution infrastructure.

10 These are the Cities of Fresno, Merced, Tulare, Madera, Bakersfield, Stockton, Manteca, Tracy, and Hanford.

11 SB 552 addresses public water systems: disadvantaged communities: consolidation or extension of service: administrative and managerial services.

12 SB 1456 changes repayment stipulations for PWSs "regardless of whether the community water system or not-for-profit non-community water system is owned by a public agency or private not-for-profit water company." However, grant or principal forgiveness is only available to systems serving DACs. For water corporations regulated by the Public Utility Commission (privately-owned systems), principal forgiveness is available to PWSs serving DACs with fewer than 3,000 service connections. This arguably improves access to funding by professional/private water systems that serve DACs. Now, Severely Disadvantaged Communities (SDACs) can get up to 100% principal loan forgiveness of SRF funded planning, design or construction projects. CWSs serving DACs may be eligible for no-interest loan financings.

13 Armona is unincorporated and classified as a SDAC; its PWS, the Armona CSD, was supported by the SWRCB to complete construction on its $9.28M drinking water improvement project with $5 million in principal forgiveness and a $4.28 million, 30-year, 0% interest rate loan. Given its distance from the City of Hanford, (3.5 miles), consolidation was not considered a viable option. After non-compliance with the arsenic MCL since 2008, the community has been working toward a long-term solution in the form of a new groundwater well, arsenic treatment plant, finished water storage tank, and a connection from the new facilities to the existing distribution system. Water rates have been slowly increasing over time to accommodate the 30-year loan repayments (SWRCB 2017n).

14 Proposition 84, or the Safe Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act "allows for smaller water suppliers to be absorbed by larger water suppliers if the cost of maintaining those smaller systems could not be maintained."

15 There are five unincorporated communities within the existing City of Tulare SOI (Matheny Tract, Tract 396, Lone Oak Tract, Soults Tract and Tract 103) (Tulare County LAFCO, 2013). The City of Tulare has not made a similar determination to identify these communities as DUCs but has pledged to review this in their next SOI update (Tulare County LAFCO 2013).

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