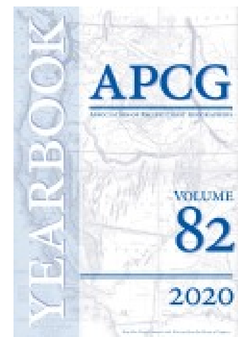
The Social Production of the Great California Drought, 2012–2017



Brian Pompeii

Yearbook of the Association of Pacific Coast Geographers, Volume 82, 2020, pp. 15-37 (Article)

Published by University of Hawai'i Press
DOI: https://doi.org/10.1353/pcg.2020.0002

The Social Production of the Great California Drought, 2012–2017

Brian Pompeii
California State University, San Bernardino

ABSTRACT

California is still in the process of recovering from the Great California Drought. Though the drought has been alarming for California at large, given the state's dependency on water-intensive agriculture and long-distance water transport to supply its growing population, the impacts have by no means been distributed equally. In this article I highlight the ways in which the Great California Drought was socially produced, revealing how exposure to the drought was funneled to the most marginalized populations in the San Joaquin Valley of California. Tulare County is often labelled as the epicenter of the Great California Drought because it has had the most domestic well failures of any county in California. There is a clear relationship between large-scale industrial agriculture well drilling and domestic well failure, suggesting the narrative behind agricultural water scarcity in the region is not simply a climate crisis, but a socioeconomic crisis as well. East Porterville, a small community in Tulare County, was one of the most exposed communities during the drought. Their increased exposure, coupled with the social status of its residents, produced a type of political vulnerability not experienced by other Californians. This case study reveals that the Great California Drought magnified preexisting socioenvironmental inequalities and geographically uneven development. Access to water was not determined by geography, but was socially produced.

Keywords: *drought, Great California Drought, hazards, political vulnerability*

California is still in the process of recovering from the Great California Drought, a title often used by researchers and the media to describe the exceptional climate conditions roughly between 2012 and 2017 (Boxall 2017; Harootunian 2018; Bogan et al. 2019). The time frame between 2012 and 2014 represents the driest period in California over the past 1,200 years (Griffin and Anchukaitis 2014). From 2012 to 2015, snow melt in the Sierra Nevadas was five percent of the annual average (Margulis et al. 2016). Snow melt feeds streams and rivers in the Central Valley of California, and stream flow of the major rivers (Kings, Kaweah, Tule, and Kern) was the lowest it had been in 2,000 years (Adams et al. 2015). Regional climate models project that the probability of these "exceptional" conditions is likely to increase in the near future, in both severity and frequency (Diffenbaugh et al. 2015).

Though the drought has been alarming for California at large, given the state's dependency on water-intensive agriculture and long-distance water transport to supply its growing population, by no means have the impacts been distributed equally. In this article I highlight the ways in which the Great California Drought was also socially produced, revealing how exposure to the drought was funneled to the most-marginalized populations in the San Joaquin Valley of California.

The Great California Drought

The historical response to water scarcity in the San Joaquin Valley was either to withdraw water from the largest lake west of the Mississippi, Tulare Lake, or to withdraw groundwater. However, Tulare Lake has been completely dry since 1899 due to overdraft. Today, the lake is farmland along the border of Kings County and Tulare County (Arax and Wartzman 2005). With the disappearance of this surface water in a region that receives only about eleven inches of rain per year, farmers became more dependent on groundwater. This reliance, which turned this semi-arid region into the most productive agricultural region in the United States, also led to drastic land subsidence (Poland 1960; Holzer and Galloway 2005). Today, land subsidence in the valley is as much as one hundred-fifty feet in some locations. In a matter of 150 years, the San Joaquin Valley has completely rearranged its hydrology, its flora and fauna, its air quality, and even the land itself, prompting the USGS to call this region the most human-transformed environment in the world (Galloway and Riley 1999).

Given these water supply issues in an increasingly important agricultural region, the United States Bureau of Reclamation created the Central Valley Project in 1933 (Hundley 2001). Part of this project sought to divert water from the generally wetter northern California to the drier south. In 1951, the Bureau completed the Friant-Kern Canal, which diverts approximately 1 million acre-feet of water per year from the San Joaquin River south into the Tulare Basin, rather than letting it flow naturally to the Delta Region and San Francisco Bay. In most years after the completion of the canal, the river would disappear completely for nearly sixty miles before receiving in-river flow pumped from the Sacramento-San Joaquin Delta via the Delta-Mendota

Canal. This cascading network of water infrastructure from north to south is just one part of California's complex water system. The San Joaquin River is fed by Sierra Nevada snowmelt, stored in Millerton Lake, and diverted south via the Friant-Kern Canal for 152 miles into Fresno, Tulare, and Kern Counties. More recently, water diversions from the San Joaquin River to the Canal were limited during the Great California Drought, to keep a required amount of in-river flow to protect the delta smelt in accordance with the Endangered Species Act (Hobbs and Moyle 2017; Moyle et al. 2018).

In 2015 the Friant-Kern Canal delivered only 58,000 acre-feet of water, or about five percent of its annual average. As junior rights holders to this water compared with Kern County, Tulare County received none of this allotment. The decrease in available surface water pressured Tulare farmers to rely more on groundwater pumping, a shift that is historically seen in areas with rapid decline in surface water availability (Faunt et al. 2016) (Figure 1).

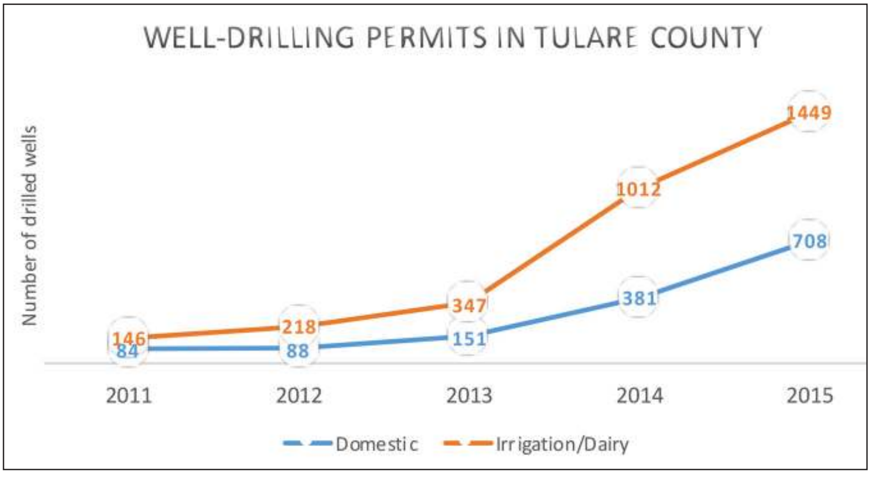


Figure 1.—Number of applications for well-drilling permits in Tulare County by type, 2011–2015. Date from the Tulare County Environmental Health Division.

Many farmers drilled multiple deep wells on their property during the Great Drought. Paramount Farms, for example, drilled twenty-one new wells in 2015 alone. Paramount, operated by the Wonderful Company, is owned by Stewart Resnick of Beverly Hills—the wealthiest farmer in the United States, with a net worth of more than nine billion dollars (*Forbes Magazine 2020*). Resnick is also the majority owner of the Kern Water Bank, a private underground water storage facility that uses publicly subsidized water transportation infrastructure to profit from water sales (Arax 2019). Another large farm operation, the Boston Ranch, drilled fifteen new wells in 2015. Boston Ranch is part of the JG Boswell family empire, once the largest private landowner in the world and instrumental in draining Tulare Lake during a drought in the late 1880s. The operation has since drilled over fifty-two wells in the dry bed of the lake, some reaching more than 2,500 feet down into the Earth's lithosphere (Arax 2019). Other industrial farm operations have been taken over by large, non-local financial firms with questionable connections to local agriculture. The John Hancock Insurance Company of New York drilled twelve new wells in 2015. Sun World Farms drilled eight new wells. Sun World Farms, a subsidiary of Black Diamond Capital Management based out of London and St. Thomas, drilled eight new wells, and another non-local firm, Deer Creek Investments, drilled five new wells as part of a bottled-water operation.

Recent farm well drilling behavior reveals myriad connections between the Great Drought and the global political economy. The emerging global demand for one crop in particular—almonds—illustrates how local scarcities can be intimately tied to global economic trends and capital movement. In the last two decades, almonds have tripled in price (Arax 2019). Increasing global demand for almonds can largely be attributed to booming middle classes in China and India demanding more luxury crop items such as nuts. Seventy percent of almonds grown in California are currently exported, with the three largest importers being China, India, and Spain (Almond Board of California 2018). This increase in demand and potential profits incentivized farmers and corporations to double the amount of acreage devoted to almonds in Tulare County, from 1,269 acres in 2013 to 2,677 acres in 2015.

Almonds are a water-intensive crop; it is estimated that, from seed to harvest, a single almond requires one gallon of water (Kristof 2015). It takes approximately four to five years for an almond tree to begin producing nuts, a growth period when the trees are regularly flood irrigated. If a farmer transitioned his or her fields to almonds in 2012 because of anticipated future profits, they were committed to watering them into at least 2016 or risk losing their entire investment. In the 2014–2015 fiscal year, California almond growers exported 1.17 billion pounds of almonds (Almond Board of California 2018). At approximately 350 almonds per pound, one could argue that Californian farmers exported 409 billion gallons of water during the peak of the drought. This is equivalent to 1.26 million acre-feet of water, roughly the amount the Friant-Kern Canal transports in an average year.

Yet, at the same time as the global almond boom and subsequent California well-drilling bonanza, domestic well failures in Tulare County began to increase in frequency. Tulare County is often labelled as the epicenter of the Great California Drought because it has had the most domestic well failures of any county in California—1,610 between 2014 and 2016 alone. As detailed below, there is a clear relationship between large-scale industrial agriculture well drilling and domestic well failure during the Great California Drought, suggesting the narrative behind agricultural water scarcity in the region is not simply a climate crisis, but a socioeconomic crisis as well.

Well Failures and Social Vulnerability in Tulare County

The Tulare County Environmental Health Division is tasked with approving well drilling permit applications. Well location data are available only at the scale of approximately 640-acre sections, instead of latitude and longitude coordinates, and depths are not available because property owners do not know exactly where the successful well will be drilled on their property when filling out the application. Well location data is also considered sensitive and a potential security issue. However, data from the Tulare County Drought Task Force recording the latitude and longitude of reported domestic well failure between 2014 and 2015 was available. These data allowed for a simple geographic overlay of reported domestic well failures over the count of new wells drilled in each section (Figure 2). For sections with a domestic dry well, the average amount of new wells drilled in 2014–2015 was 5.2 (2.4 Agricultural, 2.1 Domestic). For sections without a dry well, the average amount of new wells drilled in 2014–2015 was 1.6 (1.2 Agricultural, 0.3 Domestic). There is a statistically significant difference in the number of well drilling permits issued for sections with a domestic dry well compared to those without. The implication here is that the increase in new wells drilled was not encouraged because more wells were failing, rather the association of new wells drilled and the higher presence of dry wells suggests that domestic wells were failing because more industrial agriculture wells were being drilled.

The largest cluster of domestic well failures appears in the southeast region of Figure 2. This region includes Porterville and surrounding unincorporated communities. The city of Porterville has a municipal water provider that relies on several deep groundwater wells and therefore was not as exposed to the drought as surrounding unincorporated communi-

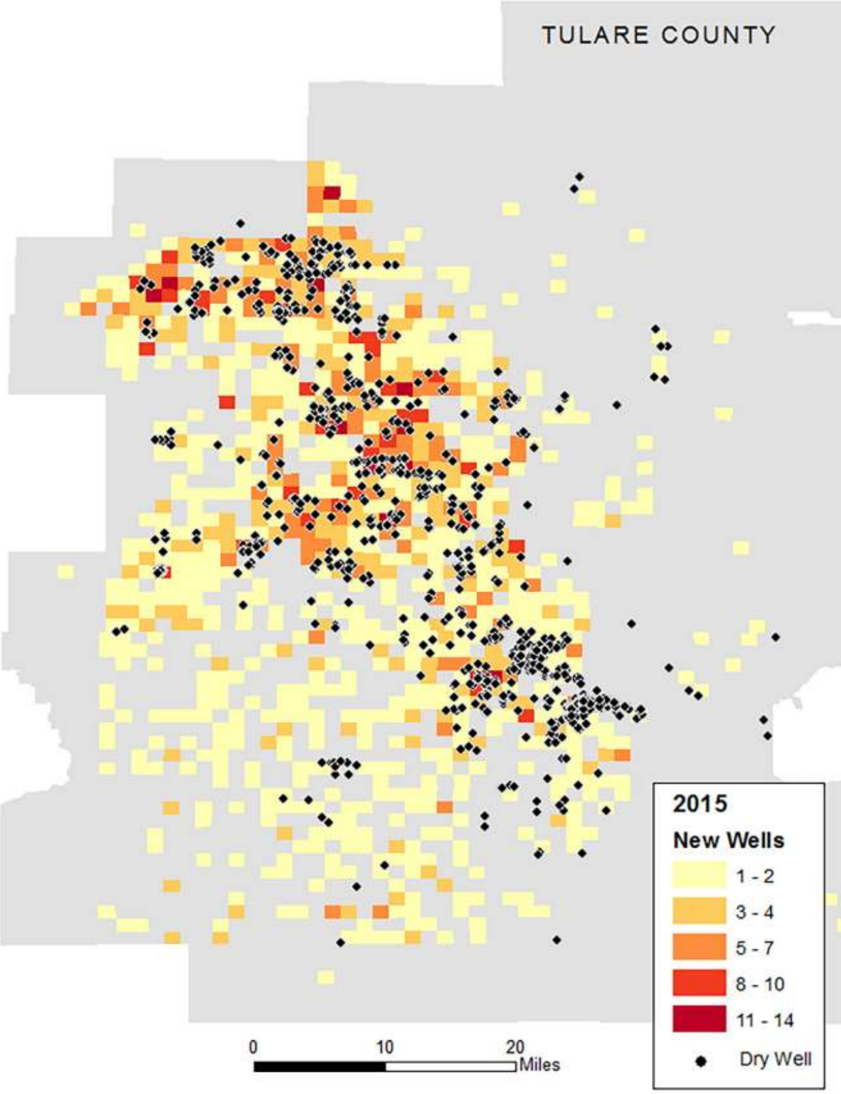


Figure 2.—The western half of Tulare County. Each section equates to 640 acres and represents the number of wells drilled in that section. Dry well points overlaid.

ties. One such unincorporated community with no municipal water supply or infrastructure was East Porterville. East Porterville's population is approximately 7,000 to 8,000 residents, all of whom are reliant on relatively shallow (twenty-five- to forty-foot deep) domestic wells. Internal reports and interviews with local community organizations estimate that sixty-seven percent of East Porterville residents are renters, eighty-five percent work in the fields as farm labor, and thirty to thirty-five percent are undocumented immigrants. In comparison to Tulare County and the city of Porterville, East Porterville has a higher percentage of Hispanic or Latino persons and a higher percentage of people living in poverty (Table 1).

Table 1. Region demographics. Data from U.S. Census 2015.

	Tulare County	**Porterville**	**East Porterville**
Population	436,234	54,165	7,331
% Hispanic or Latino	59.8%	61.9%	72.9%
% in Poverty	28.1%	28.8%	36.9%

East Porterville was one of the most exposed communities during the Great California Drought. This increased exposure, coupled with the social status of its residents, produced a type of political vulnerability not experienced by other Californians.

Political Theories of Vulnerability

Political vulnerability is vulnerability that is produced along lines of race, status, or class identity. Bolin and Stanford (1998) examined the production of political vulnerability and the unmet recovery needs of Southern California residents following the 1994 Northridge Earthquake. By conducting in-depth interviews with residents, community-based organizations, and non-governmental organizations, they discovered that the disaster magnified already existing social inequalities, particularly in terms of access to essential livelihood resources. Within their place-specific account of vulnerability, they also determined that the uneven distribution of people's exposure to the disaster was less of a contributor to vulnerability than the ability to cope following the disaster. A community-based vulnerability assessment aided the ability to make specific policy and organizational suggestions to remedy the unmet needs of residents following the earthquake.

Vulnerability is assessed here through the use of a similar community-based assessment. A community-based vulnerability assessment recognizes that the conditions that shape exposure and sensitivity are community-specific, and such an assessment therefore works from the bottom up to identify these conditions in the community itself (Smit and Wandel 2006). The practice of community-based research necessitates in-depth and active participation with stakeholders, a long-term commitment to collecting information on relevant local human-environmental processes, the use of multiple sources of information, and maintenance of a continuous relationship with decision-makers and members of the community (Smit and Wandel 2006; Ford and Smit 2004; Lim et al. 2004; Sutherland et al. 2005). Smit and Wandel (2006) also identify the possibility for this approach to be used in tandem with the Blaikie et al. (2014) Pressure and Release (PAR) model that recognizes the global network of "root causes" and the local manifestations of "unsafe conditions."

With this approach in mind, the goal of a community-based vulnerability narrative is to identify and describe "the conditions of risks (current and past exposures and sensitivities) that people have to deal with, and how they deal with these, including the factors and processes that constrain their choices" (Smit and Wandel 2006, 289). The result of this process is not intended to produce a score of vulnerability, but rather to document the nature of vulnerability, along with its various complex components, so that communities can design strategies to increase coping capacities while decreasing sensitivities. Further, these methodologies recognize the complex relationships between various exposures, sensitivities, and coping capacities throughout time. As Smit and Wandel (2006, 288) state, "What is vulnerable in one period is not necessarily vulnerable (or vulnerable in some other way) in the next, and some exposures and sensitivities develop slowly over time."

Ford and Smith (2004) proposed an analytical framework for assessing the vulnerability of communities to climate change. Using communities in the Canadian Arctic as an example, they suggest an approach that relies heavily on historical accounts and local knowledge to document changes in hazard exposure and coping strategies through time. In Ford and Smith's (2004, 396) own words: "By examining past responses to climate variability and extremes and having the community identify its future adaptation options and constraints, researchers can characterize a community's ability to cope with future changes and collaborate to identify adaptive strategies that will reduce risk." Their case-study examples intersect local observational accounts of climate change and individual responses with biophysical measurements of changes in sea ice, permafrost, river dynamics, and species dynamics. The benefit of this approach is the ability to utilize information regarding how communities have historically experienced hazards, then identify what biophysical or social conditions have changed, and finally identify the conditions that could potentially constrain the community's ability to cope in the future (Ford and Smith 2004).

Methods

A community-based vulnerability assessment requires qualitative data-collection methodology. Data for this project was collected with the use of participant observation and semi-formal interviews conducted with responders and residents coping with water scarcity. Semi-formal interviews were used to elicit people's ideas, opinions, and knowledge about local socio-environmental conditions. Questions focused on drought response, coping strategies, and unmet needs. Fifty-four interviews were conducted in the summers of 2016 and 2017 with local officials, NGOs, and local residents. Participant observation included attending meetings and participating in drought assistance tasks. Institutional research participants included: Tulare County, Office of Emergency Services, California Department of Water Resources, Porterville Area Coordinating Council (PACC), United Way, Self-Help Enterprises, Community Services Employment Training (CSET), and the Community Water Center (CWC). Interview participants were recruited from among disaster responders, volunteers with community organizations conducting drinking water delivery, or members of the Drought Resource Center in East Porterville. All interviews were recorded, transcribed, and coded for themes of response, coping, and unmet needs.

A Community History of Water Vulnerability

A creeping hazard is a hazard with no clear beginning or end. Unlike other hazards such as a tornado, earthquake, or hurricane, it is not always clear when to begin responding to a drought at an institutional or individual level. In the case of East Porterville, an official response started long after the biophysical conditions of the drought manifested and water stopped flowing from local household taps. This section details this creeping hazard response—in the sense of institutional response and household coping strategies—to display how exposure to the drought was funneled to the most marginalized populations of Tulare County and the San Joaquin Valley.

In December 2013, it was recognized that the Central Valley Project (CVP), including the Friant-Kern Canal, was at five percent of its usual flow and deliveries, and that a continued shortage was anticipated. After a string of historic annual lows in precipitation, Governor Brown declared a state of emergency on January 17, 2014. One month later, a local drought emergency was declared in Tulare County. At this time, the National Drought Monitor Index designated all of Tulare County with the most severe drought classification, D4, signifying exceptional drought conditions. The following month, with conditions worsening, a local drought task force was created—the first in county history. In June, the Porterville Area Coordinating Council (PACC), a collective of local churches, reported forty dry wells in East Porterville. At that point, the Tulare County Drought Task Force had officially reported only thirty dry wells in the entire county. This represents one of the first signs that people in East Porterville were not reporting dry wells to the authorities.

In July 2014, a 5,000-gallon water tank was installed at the local East Porterville fire department, and residents were allowed to bring their own containers to collect this non-potable water for household use. Thus the first drought-hazard response in one of the most exposed communities in California came seven full months after a statewide declaration of emergency and six months after a county-wide declaration of emergency. The following month, the drought task force initiated the first concrete response to address these water needs. The task force identified 183 homes in need of bottled drinking water, and brought enough drinking water for 300 homes—but the supply was depleted within only hours of arriving in the community. County officials now became fully aware that there were many more homes without water in East Porterville than were reporting outages, and they began a more concerted effort to deliver applications for bottled water delivery in the community.

This study revealed that residents were resistent toward—or even fearful of—filling out paperwork certifying that their home lacked running water. Interviews revealed that individual community organizers and the PACC had a highly significant influence in coordinating the provision of emergency water. PACC identified households known to be without water, but which were reluctant to provide documentation, and simply posted signs outside each household reading "No Water" along with the number of occupants (Figures 3, 4). The drought task force then began delivering to these households without relying on paper records.

Interviews revealed a number of reasons for residents' fear of water vulnerability documentation. Many participants referenced rumors or gossip around town that verifying a lack of water would lead to eviction,

Figure 3.—Household with a dry well. Sign posted by Porterville Area Coordinating Council (PACC). Photo by author.

Figure 4.—Sign posted by Porterville Area Coordinating Council (PACC). This household needs drinking water delivery for six people. Photo by author.

deportation, loss of children to child welfare services, or costly citations for building-code violations. These fears kept East Porterville residents from reporting their dry wells, even to partnered local NGOs. One community outreach specialist captured this fear:

> I think the biggest…barrier is a lot of the people that are affected by the drought are individuals who for one reason or another might not be so trusting of the services that are being provided. There are some rumors that went around that child services or child law services would take away the children in your home. Because you don't have water. … so then naturally people were afraid to come

> forward and report that their well was dry and that they didn't have any water in their home.
>
> We knew there were dry wells going on but people weren't coming to tell us about them. They would tell their friends and their neighbors but they wouldn't come forward for fear of, you know, repercussions for not having water.
>
> —Interview with CSET responder (July 5, 2016)

Fear continued to play an important role in how residents of East Porterville accessed drought response services. In interviews, residents often expressed how difficult it is to work in the agricultural fields and not have the ability to take a shower. In November 2014, a drought resource center and public shower were established in the parking lot of a local church (Figures 5, 6, 7). The center served as an ad hoc office where residents could receive information on how to apply for and receive assistance. Public showers allowed residents—most of whom had worked long hours in the fields and in regular proximity to toxic chemicals—the basic necessity of cleanliness, and

Figure 5.—Temporary Drought Resource Center in parking lot of local East Porterville church. Photo by author.

Figures 6 and 7.—Temporary shower stations in local church parking lot. Photos by author.

at peak use about two hundred people used the showers on a regular basis. During interviews, three residents noted that many community members feared using the shower or resource center because of video surveillance cameras, the presence of a security guard, and the historical legacy of entrapment events in the San Joaquin Valley used as a means to capture and deport people. For example, one interviewee mentioned an advertised free BBQ in a park ten miles north of Porterville that turned out to be an ICE deportation sting (Personal Interview 8/17/2016). Thus, though the provision of showers did help residents cope with water stress, it did not come without social complications.

In December 2014, eleven months after California's state of emergency declaration, there were over one thousand reported households with dry wells in a community with fewer than eight thousand people. A large percentage of East Porterville residents had been without water for a year or more. The stress of living in a creeping hazard, a hazard with no clear beginning or end, takes a toll on the practice of everyday life. Without water, everyday tasks such as washing clothes, cleaning the house, personal gardening, flushing the toilet, cooking, and showering transformed from low-effort tasks to daily sources of stress, as thousands of people became reliant on traveling to the fire department to fill up buckets and tanks for their daily water needs. One thirty-year resident summarized the experience:

> I used to haul the water and boil it on the stove for my daughters to shower. And then I just got a five-gallon bucket and I only have to use a little bit, just quick showers. And it's hard. I've been going through this with my family and it's just me and my family, but picture 1,800 families around and then some of them, they can't even do anything, some of them are ill. At least I can move, I can do things for my family. And people who doesn't really know a day without water, they don't care… But when you come through this, for so long, it's a different challenge. It's just very, very difficult.
>
> —Personal Interview with resident (7/17/16)

Water Access and Fragmented Governance

In September 2014, nine months after the state of emergency declaration, the state officially began to assist with funding. Tulare County funneled the state funding through three local non-governmental organizations, significantly slowing the drought response due to arcane regulations specifying that only NGOs, not governmental entities, could receive full state reimbursement. It is important to further observe that the source of funding for these response activities was the State Water Board Clean-up and Abatement Fund. This fund is intended "to provide public agencies with grants for the cleanup or abatement of a condition of pollution when there are no viable responsible parties available to undertake the work" (Water Code Sections 13440-13443). The pollution notorious to these agricultural communities includes nitrates and 1,2,3-TCP. Nitrates, a byproduct of generations of applying chemical fertilizers, percolates into the groundwater and have been linked to infant methemoglobinemia, often referred to as "blue baby syndrome." A high concentration of nitrates in drinking water limits the body's ability to carry oxygen in blood cells, causing babies to appear blue (Majumdar and Navindu 2000). 1,2,3-TCP is a byproduct of plastic manufacturing. Since the 1940s, companies like Dow and Shell have deployed it as a filler ingredient in pesticides simply because they did not know what to do with the toxin. The chemical lingers in the soil and the water and is one of the most dangerous carcinogens in the United States (Arax 2019). To qualify for funding from the Cleanup and Abatement fund, households had to be located within one mile of a listed contamination point; every household in East Porterville, and almost all of Tulare County, qualifies for the program. Thus, households in East Porterville were not receiving drinking water assistance because there was no water coming out of their taps, but because if water was coming out of their taps, it would be toxic.

To relieve the stress of making daily trips to collect water, a household tank installation program was established in late December 2014. CSET installed individual, non-potable water tanks that could connect to household infrastructure for each home (Figure 8).

The program greatly reduced the stress of hauling water for basic needs such as cleaning, laundry, and flushing the toilet. One East Porterville homeowner who received a household tank reflected on life before their tank:

> Well, for one you don't have clean clothes, you can't take a shower, you can't wash your toilet regularly. I ended up having to smell the urine, which I didn't like. That was horrible and I had my son he was going to…high school, I couldn't let him take a shower. I couldn't. I wasn't able to get him clean clothes all the time…having a washer and dryer and can't even use it.
>
> —Single mother, resident since 1987 (Personal Interview August 3, 2016)

Figure 8.—Personal tank connected to household plumbing. Photo by author.

The individual household tank installation greatly reduced exposure to the drought. However, the program was not available to a vulnerable subset of East Porterville residents. Renters, who comprise two-thirds of East Porterville's population, were not able to apply for the program because of regulations preventing government from subsidizing businesses—including landlord-owned properties. Since landlords had to pay for emergency water tanks themselves, disaster aid was essentially limited to local property owners.

The governance of water vulnerability in this case reveals profound disconnects between local needs, stakeholder incentives, regulatory policies, and the realities of daily life in East Porterville. Landlords were hesitant to report dry wells because they feared they would be financially on the hook to provide basic water access to tenants. Tenants were equally hesitant to report water needs because they feared eviction or other legal sanction when landlords were unable or unwilling to install household tank systems. In the meantime, while the Tulare County Office of Emergency Services (OES) is required by law to remove people from their homes if they lack running water during a disaster response, the county decided to overlook the thousands of homes in violation. As one OES official noted, "If this was an earthquake and these homes didn't have water, we wouldn't let these people in their homes. [But] we can't kick all these people out (Personal Interview 7/21/2016).

Yet while the county forgave these drought-induced violations, it refused to overlook the cost to the state of providing disaster assistance to renters. American governments have a long history of subsidizing agricultural businesses, often by providing multi-billion-dollar water infrastructure projects such as California's State Water Project and the federal Central Valley Project. During the period of the Great California Drought (2012–2017), the average annual subsidies to farms in Tulare County was $32.4 million. This number does not even count disaster-related farm subsidies to Tulare County, including almost $15 million in direct assistance from 2014 to 2016, and additional assistance for events such as early frost, flooding, fire, and drought (EWG Farm Subsidy Database). Meanwhile, by January 2016 over one-thousand households in East Porterville, where approximately eighty-five percent of the population works in agriculture, still did not have running water in their homes because of a dry well. One participant household, a family of seven, did not have running water in their home for years, even as water was present all around their home: in their front yard, a citrus orchard received daily irrigation, while the backyard overlooked a large, empty, suburban home with a daily-irrigated lawn (Figures 9, 10).

As the crisis slowly grew, pressure began building on the city of Porterville to connect East Porterville to their municipal water system. Porterville was willing, but would require a $5,000 connection fee per household, a cost not feasible for many in the community. East Porterville residents, with the help of a local non-profit, organized an advocacy group, East Porterville for Water Justice (EPWJ). Through the use of media and public outreach, which led to a series of high-profile stories in the *Los Angeles Times* and *The New York Times* (Medina 2014; Nagourney 2015, 2015a, 2016; Molina 2016), EPWJ heavily pressured the governor's office to resolve the years-long crisis. Ultimately, the state agreed to pay the cost of connecting East Porterville to the Porterville municipal supply, if property owners agreed to pay a water bill, fill in their existing well, and consent to future annexation into Porterville. While a small portion of residents publicly opposed the agreement to avoid additional fees, taxes, and regulations, all interview participants lacking water expressed interest in annexation. Yet in 2015–2016, as the county, NGO responders, and community organizers campaigned to get property

Figure 9.—A household without running water for over 1.5 years.

owners in East Porterville to sign an Extraterritorial Service Agreement (ESA) stipulating the conditions of municipal water connection, convincing residents to sign up proved difficult because of aversion to government documentation and absentee landlordism.

In August 2016, construction began to connect East Porterville to the Porterville municipal water supply. In March 2017, three years and three months after the declaration of an emergency, 300 homes in East Porterville had a newly secure water supply. In February 2018, more than four years since the beginning of drought response and after six years of experiencing drought conditions, 755 additional homes in East Porterville were connected to the municipal supply. Residents endured more than three years of hauling water daily to clean, cook, and flush their toilets, and more than three years of spending money on bottled water and laundromats, all to access a fundamental resource freely available to most Americans.

Figure 10.—The neighboring empty house for sale, with a sign that reads "deep well." The house behind the trees in Figure 10 is the same house as in Figure 9.

Conclusion

This case study reveals that the Great California Drought magnified preexisting socioenvironmental inequalities and geographically uneven development. Access to water was not determined by geography, but was socially produced. Social redistribution policies related to water supply funding ultimately benefitted the wealthy elite, while the poor were subjected to the rugged forces of capitalism. After the smoke cleared from the government's policy response to the crisis, exposure to the Great California Drought had been essentially funneled to the most marginalized populations. Disaster recovery in Tulare County can be described as a creeping response to a creeping hazard.

During every year of the drought, and every year since, California-based agriculture business profits have increased (Arax 2019), even as authorities often cry "poor" when vulnerable residents lose basic necessities such as water. Many of the crops produced are not consumed in-state or even in the U.S., but are shipped as luxury crops to overseas consumers. The examples outlined above are just the latest illustrations of how California projects the process of uneven geographic development, particularly when considering the rural-urban divide. Wealthier coastal cities receive fossil fuels, water, and food from the Central Valley, and even send residents convicted of crimes to valley prisons. In history as in the present day, the people who suffer most in this current political economy are immigrant farm laborers. In his pivotal book, *Factories in the Field,* first published in 1935, Carey McWilliams bemoaned the relationship between the industrial agricultural complex and the recently arrived laborers:

> The…solution will come only when the present wasteful, vicious, undemocratic and thoroughly antisocial system of agricultural ownership in California is abolished. The abolition of this system involves at most merely a change in ownership. The collective principle is there; large units of operation have been established, only they are being exploited by private interests for their own ends. California agriculture is a magnificent achievement: in its scope, efficiency, organization and amazing abundance. The great farm valleys of California, rescued from sagebrush and desert, are easily among the richest agricultural regions of the world. The anachronistic system of ownership which they are present controlled must be changed before the valleys can come into their own. That day, as it now seems, is far distant. In the meantime, the dust-bowl refugees, unlike the pioneers of '49, have made the long trek West to find not gold but labor camps and improvised shantytowns. It is just possible that these latest recruits for the farm factories may be the last, and that out of their struggle for a decent life in California may issue a new type of agricultural economy for the West and for America.
>
> —C. McWilliams (2000: 325)

Thus, uneven development is nothing new in the Central Valley. It has been manifest along lines of race, ethnicity, and class for the past three-hundred years, starting with the treatment of Native Americans in early mission agriculture and continuing through each subsequent cycle of recently arrived migrants, including Chinese, Hindu, Black refugees from the South, and Okies. Perhaps McWilliams could not imagine the next ill-treated migrants would be Mexicans, given the prevalence and relative power of the group in California at the time he was writing. But ultimately, as with generations of vulnerable peoples who came before, exposure to the Great California Drought was funneled to the most marginalized populations: politically vulnerable people who labor in the fields and do not own land. The unevenness continues.

Literature Cited

Adams, K. D., R. M. Negrini, E. R. Cook, and S. Rajagopal. 2015. Annually resolved late Holocene paleohydrology of the southern Sierra Nevada and Tulare Lake, California. *Water Resources Research* 51 (12):9708–9724.

Almond Board of California. *Annual Report: Almond Almanac 2018*. http://www.almonds.com/sites/default/files/Almond_Almanac_2018_F_revised.pdf

Arax, M., and R. Wartzman. 2005. *The King of California: JG Boswell and the Making of a Secret American Empire*. London: Hachette UK.

Arax, M. 2019. *The Dreamt Land: Chasing Water and Dust across California*. New York: Vintage.

Black Diamond Capital Management. Welcome. http://www.bdcm.com [last accessed 13 May 2020].

Blaikie, P., T. Cannon, I. Davis, I. and B. Wisner. 2014. *At Risk: Natural Hazards, People's Vulnerability and Disasters*. New York: Routledge.

Bogan, M. T., R. A. Leidy, L. Neuhaus, C. J. Hernandez, and S. M. Carlson. 2019. Biodiversity value of remnant pools in an intermittent stream during the great California drought. *Aquatic Conservation: Marine and Freshwater Ecosystems* 29 (6):976–989.

Boxall, B. "Is the great California drought finally ending?" *Los Angeles Times* 11 January 2017.

Deepanjan, M., and N. Gupta. 2000. Nitrate pollution of groundwater and associated human health disorders. *Indian Journal of Environmental Health* 42 (1):28–39.

Diffenbaugh, N. S., D. L. Swain, and D. Touma. 2015. Anthropogenic warming has increased drought risk in California. *Proceedings of the National Academy of Sciences* 112 (13):3931–3936.

EWG. EWG Farm Subsidy Database || Farm subsidies in Tulare County, California. https://farm.ewg.org/progdetail.php?fips=06107&progcode=dis misc®ionname [last accessed 14 May 2020].

Faunt, C. C., M. Sneed, J. Traum, and J. T. Brandt. 2016. Water availability and land subsidence in the Central Valley, California, USA. *Hydrogeology Journal* 24 (3):675–684.

Forbes. 2020. Stewart and Lynda Resnick. *Forbes Magazine*. https://www.forbes.com/profile/stewart-and-lynda-resnick/#501b84cf7725 [last accessed May 13, 2020].

Ford, J. D., and B. Smit. 2004. A framework for assessing the vulnerability of communities in the Canadian Arctic to risks associated with climate change. *Arctic* (2004):389–400.

Galloway, D., and F. S. Riley. 1999. San Joaquin Valley, California. Land subsidence in the United States: US Geological Survey Circular 1182:23–34.

Griffin, D., and K. J. Anchukaitis. 2014. How unusual is the 2012–2014 California drought? *Geophysical Research Letters* 41 (24):9017–9023.

Harootunian, G. 2018. California: It's Complicated: Drought, Drinking Water, and Drylands. In *Resilience*, pp. 127–142. New York: Elsevier.

Hobbs, J., P. B. Moyle, N. Fangue, and R. E. Connon. 2017. Is extinction inevitable for Delta Smelt and Longfin Smelt? An opinion and recommendations for recovery. *San Francisco Estuary and Watershed Science* 15 (2).

Holzer, T. L., and D. L. Galloway. 2005. Impacts of land subsidence caused by withdrawal of underground fluids in the United States. *Humans as Geologic Agents* 16 (2005):87.

Hundley, Norris. 2001. *The Great Thirst: Californians and Water—A History*. Berkeley: University of California Press.

Kristof, N. 2015. Our Water-Guzzling Food Factory. *The New York Times*, 30 May 2015. https://www.nytimes.com/2015/05/31/opinion/sunday/nicholas-kristof-our-water-guzzling-food-factory.html.

Lim, Bo, E. Spanger-Siegfried, I. Burton, E. Malone, and S. Huq. 2004. Adaptation policy frameworks for climate change: developing strategies, policies and measures. New York: United Nations Development Programme.

Margulis, S. A., G. Cortés, M. Girotto, L. S. Huning, Dongyue Li, and M. Durand. 2016. Characterizing the extreme 2015 snowpack deficit in the Sierra Nevada (USA) and the implications for drought recovery. *Geophysical Research Letters* 43 (12):6341–6349.

McWilliams, C. 1939. *Factories in the Field: The Story of Migratory Farm Labor in California*. Republished 2000 by University of California Press.

Medina, J. 2014. With Dry Taps and Toilets, California Drought Turns Desperate. *The New York Times*, 2 October 2014. https://www.nytimes.com/2014/10/03/us/california-drought-tulare-county.html.

Molina, G. 2016. The Wells Have Run Dry in This California Town, so Why Is a $1.2-Million Water System Untapped? *Los Angeles Times*, 6 May 2016. https://www.latimes.com/local/drought/la-me-east-porterville-drought-20160506-story.html.

Moyle, P. B., J. A. Hobbs, and J. R. Durand. 2018. Delta smelt and water politics in California." *Fisheries* 43 (1):42–50.

Nagourney, A. 2015. As California Drought Enters 4th Year, Conservation Efforts and Worries Increase. *The New York Times*, 17 March 2015. https://

www.nytimes.com/2015/03/18/us/as-california-drought-enters-4th-year-conservation-efforts-and-worries-increase.html

———. 2015a. The Debate Over California's Drought Crisis. The New York Times, 15 April 2015. https://www.nytimes.com/2015/04/15/us/the-debate-over-californias-drought-crisis.html

———. 2016. As California Water Use Rises, Some Ask: Were Limits Eased Too Soon? *The New York Times*, 19 October 2016. https://www.nytimes.com/2016/10/20/us/as-drought-california-water-use-rises-some-ask-were-limits-eased-too-soon.html

Poland, J. F. 1960. Land subsidence in the San Joaquin Valley, California, and its effect on estimates of ground-water resources. *International Association of Scientific Hydrology Publications* 52:324–335.

Smit, B., and J. Wandel. 2006. Adaptation, adaptive capacity and vulnerability. *Global Environmental Change* 16 (3):282–292.

Sutherland, K. B. Smit, V. Wulf, and T. Nakalevu. 2005. Vulnerability to climate change and adaptive capacity in Samoa: the case of Saoluafata village. *Tiempo* 54:11–15.