Drinking Water Violations in Low Income Communities in Texas and California

An ArcGIS assessment of the correlation between poverty and drinking water violations and its implications.

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1. Introduction:

In 2017, the American Society for Civil Engineers (ASCE) gave the US infrastructure system a D+ grade (Engineers 2017). Essentially, ASCE noting that the majority of U.S. infrastructure had reached the end of its lifetime. In Fall 2015, the Flint Water Crisis highlighted the dire consequences of utilities and local officials being unequipped to handle the economic decline of their cities. At the center of the growing national spotlight on water infrastructure are two increasingly identified issues.

(1) There are shortfalls in the Safe Drinking Water Act (SDWA) in terms of violation reporting, funding failing water infrastructure and inadequate water treatment facilities, and adequately listing contaminants (NRDC 2016). (2) There is the growing consensus that low income communities are disproportionately impacted by poor infrastructure and water treatment (GAO 2016) (N. NRDC 2017). The purpose of this paper is to engage the latter of these issues issue. This report looks at whether there is a correlation between *reported* SDWA violations and poverty in a California and Texas counties.

Studies have shown that cities that are poorer, older, and have declining population face a two-pronged issue: (1) They must retainer more revenue in order to maintain older water infrastructure. (2) Their customer pool is poorer and smaller than most cities in the U.S. (GAO 2016). However, these studies often focus on states that have low economic growth and are declining in population. Fortunately, the USEPA gives funding to states for areas with very vulnerable and poor water infrastructure and treatment through the Drinking Water State Revolving Fund (Appendix 1).

In the midst of the increasing spotlight on infrastructure, it's important to inquire whether these funds are helping reduce the disproportionate impact of poor drinking water system on poorer customers. This study looks at two states that are growing fairly substantively economically and in terms of population (Henderson 2017). Between 2015 and 2016, Texas and California both had a population growth of over 200,000 people. This growth makes these states some of the fastest growing states in the country. However, in 2016 both states were amongst states with the 25 highest poverty rates (Table 1).

This study uses ArcGIS to assess the two states correlation between SDWA violations and poverty. The study assesses if there is a correlation between poverty and the number of facilities with general SDWA violations and Lead and Copper violations in a given county. The findings show that there is no correlation between poverty and SDWA violations. However, counties with mid-level poverty had some of the highest number of violations per capita (i.e. considering population) in both states.

2. Background:

The Safe Drinking Water Act

The Safe Drinking Water Act was passed in 1974 to protect public health by creating standards for drinking water. The act was subsequently amended in 1986 and 1996 to add provisions such as new contaminant listings, funding of infrastructure systems, and source water protection standards.

The SDWA is administered by the United States Environmental Protection Agency (USEPA); the USEPA creates both legally enforceable SDWA standards and general goals. The USEPA identifies contaminants that should be regulated, sets th standards for testing water systems for contaminants, and sets the national standards for contaminant levels. These contaminants levels are first defined by concentration that has been scientifically proven to have zero risk to human health. These levels are maximum contaminant level goals (MCLG); they are not legally enforceable. Maximum contaminant levels (MCL) are minimized contaminant levels given current technology and cost feasibility. MCLs are the legally enforceable regulatory standard for the SDWA (USEPA 2015).

Most of the work of SDWA regulation at the state level is delegated to state environmental agencies under the USEPA’s jurisdiction. All public drinking water systems that have 15 service connections or serve 25 people or more, are regulated by the SDWA. These water systems include: (1) Community Water Systems (serves the same people year-round mostly homes and apartments) and (2) Non-Community Water System (serves people for less than a year like a school or does not serve the same people year-round like a campground) (USEPA 2015).

For all water systems that are regulated under the SDWA, water system violations can occur for a number of reasons such as a sampling protocol errors or exceedance of MCLs.

SDWA: Lead and Copper Rule

The Lead and Copper Rule was a regulation added to the SDWA in 1991 to reduce lead and water contamination from pipes and general plumbing material. The Lead and Copper Rule is to be administered in parts of the distribution system that have materials with lead or copper content. Depending on levels of lead in the distribution system, the drinking water is tested at the customer taps either every six months, annually, or every three years (USEPA 2017).

The MCL for the Lead and Copper Rule is measured in terms of an exceedance in action level (AL). If the contamination AL is exceeded, a minimum of an informal action must be taken by the system operator or state agency. The AL exceedance for lead is more than 10% of homes in a given sample area having 15 ppb lead in the water tap sample. The AL exceedance for copper is more than 10% of homes in a given sample area having 1.3 ppm copper in the water tap sample (USEPA 2017).

Health based standard (or MCLG) for lead is zero ppm, however MCLG do not require any informal or formal action (N. NRDC 2017). Examples of informal actions include letters or emails are sent out telling customers not to drink water. Formal actions include a site visit from the USEPA or legal action against the system operator or state agency (USEPA 2017).

The National Resources Defense Council SDWA Mapping

In 2016 and 2017, the National Resources Defense Council (NRDC) released two reports that used the EPA's Environmental Compliance History (ECHO), Safe Drinking Water Information System (SDWIS), and GIS to map drinking water violations by county. In *What's in Your Water: Flint and Beyond*, the NRDC mapped lead AL exceedances in community water systems (not non-community) for 2015, the population served by systems with lead AL exceedances and health based (or MCLG) violations (N. NRDC 2017) (N. NRDC 2016).

In *Threats on Tap: Widespread Violations Highlight for Investment in Water Infrastructure and Protections*, the NRDC mapped population served by community systems that had one SDWA violation 2015 or an outstanding violation from previous years. One map was general SDWA violations (i.e. sampling and violation) and the other was health based violations (N. NRDC 2017).The mapping in both reports only include violations reported by the USEPA. However, NRDC has previously reported USEPA audits of water sampling show there is substantive underreporting. For instance, at the time of the 2016 *What's in Your Water* report, 2014 Flint water treatment facility violations were not in the ECHO database (N. NRDC 2016).

Finally, both articles repeatedly mention that these SDWA violations impact low income communities the most several times, income or socioeconomic status is not mapped. They also identify that 89% of general SDWA violations are followed by an informal action (N. NRDC 2016). The inclusion of a socioeconomic indicator is what differentiates the maps created for this report.

3. Methodology:

Data Sets and Metrics Used

California and Texas were selected because the two states have similar poverty rates, high population growth rates, and opposing viewpoints on environmental regulation standards (CITE Something) (Kennedy 2016). As of 2016, California's poverty rate was 14.4 and Texas' was 15.6% (Table 1.). Between 2015 and 2016, both states had a population increase of more than 200,000 people (Henderson 2017). That population growth is greater than most other states in the U.S. (Figure 1.).

Poverty was chosen as a socioeconomic indicator for two primary reasons. The first reason is that required income to live an adequate lifestyle varies by county and state. Poverty on the other hand is calculated yearly based on a national standard that assess a variety of factors such as food diet and size of households (IRP n.d.).The second reason is the USEPA's ECHO website had only a few socioeconomic indicators such as income in a county or ethnicity in the surrounding region. However, this data was not available within ECHO for every water facility.

While data such as child poverty and adult poverty were available, in this study overall percentage of people in poverty was used to capture poverty across age demographics. U.S.

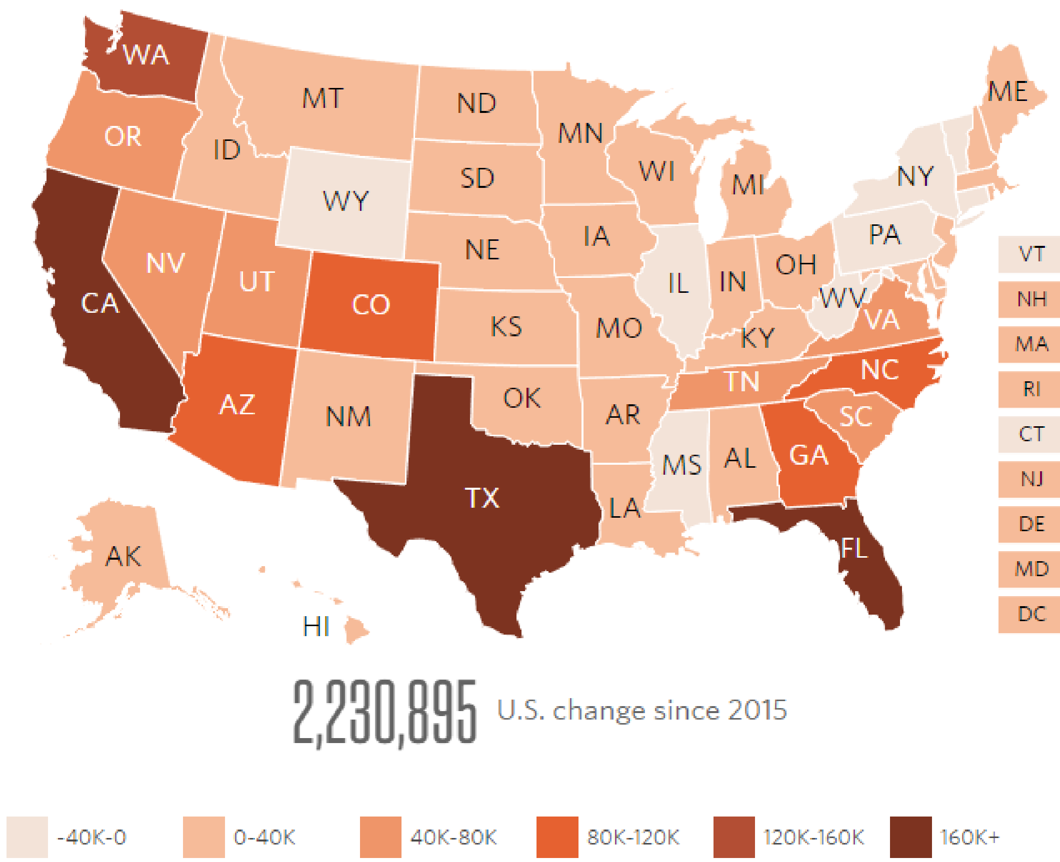
Census Bureau overall poverty percentages for 2015 was used. At the time of this analysis that was the most recent data available through the U.S Census Bureau.

ArcGIS shape files for all 258 Texas counties were downloaded from Texas Department of Transportation's (TXDoT) website. ArcGIS shape files for all 58 California counties was downloaded from California's open data portal (data.ca.gov).

Table 1. States with the Highest Poverty Rates, 2016) (USCensusBureau n.d.)

Poverty Rank	Year	County/State ID	State / County Name	All Ages in Poverty Percent
1	2016	28000	Mississippi	21
2	2016	22000	Louisiana	20.1
3	2016	35000	New Mexico	19.1
4	2016	11000	District of Columbia	18.5
5	2016	21000	Kentucky	18.2
6	2016	54000	West Virginia	17.9
7	2016	1000	Alabama	17.2
8	2016	5000	Arkansas	17.2
9	2016	4000	Arizona	16.4
10	2016	13000	Georgia	16.1
11	2016	40000	Oklahoma	16.1
12	2016	47000	Tennessee	15.8
13	2016	48000	Texas	15.6
14	2016	37000	North Carolina	15.4
15	2016	45000	South Carolina	15.3
16	2016	26000	Michigan	14.9
17	2016	12000	Florida	14.8
18	2016	36000	New York	14.8
19	2016	39000	Ohio	14.5
20	2016	6000	California	14.4
21	2016	32000	Nevada	14.1
22	2016	18000	Indiana	14
23	2016	29000	Missouri	14
24	2016	16000	Idaho	13.8
25	2016	30000	Montana	13.4

Figure 1. 2016 State Population Growth (Henderson 2017)



For both states, lead and copper rule violation and water violation data were downloaded from the EPA environmental compliance history online (ECHO) website. Only facilities that had an informal action within the past 3 years and a lead AL exceedance within the past five years (Figure 2.). The NRDC reports that 89% of SDWA violations lead to an informal action (N. NRDC 2017) (N. NRDC 2016). Thus, informal action served as a proxy for general SDWA violations.

The ECHO data set included the system names, the type of system, counties each system served, the size of population served by the system, the number of lead and copper rule violations, violation points (Figure 3.). Only active systems were included in the dataset. Unlike previous mapping by the NRDC, I included non-community water systems in my dataset.

Violation points (Figure 3.) are based on factors such as type of violation and type of action (formal or informal) taken. For instance, a MCL violation is five points, while a public notice violation is one point. In this study, violation points were used as a proxy for how severe the violation was.

Figure 2. Texas and California SDWA Violation Search Criteria for EPA ECHO (Data: Nov2017)

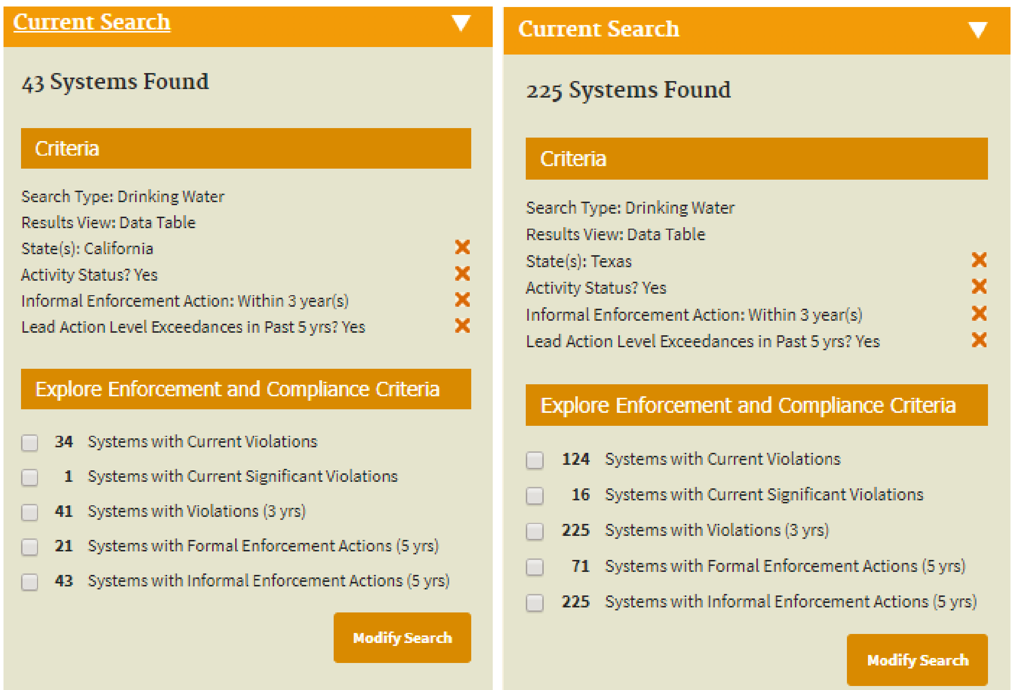


Figure 3. SDWA Violation Points Explained (USEPA 2017)

Points	Description
10 points	• Acute contaminant maximum contaminant level (MCL) violation (total coliform or nitrate)
5 points	• MCL or treatment technique violation for regulated contaminants other than total coliform or nitrate • Nitrate monitoring and reporting violation • Total coliform repeat monitoring violation
1 point	• Monitoring and reporting violation not listed above • Public notice violation • Consumer Confidence Report violation • Additional point for each year a violation is unaddressed

In order to reduce bias towards larger counties having a larger count of violations, water violations were normalized by the size of the population they serve. In the water violation spreadsheets, all of the facilities with a violation were summed up (Excel SUMIF function) in order to find the total number of facilities with a violation in each county. The total population served by the total number of facilities was also found using a summation (Excel SUMIF function).

The total amount of facilities was then divided by the total population served in each county. Dividing these two characteristics gave the metric "LeadViolationsPerCapita"; it is the number of facilities with at least one violation in the past 5 years divided by the total population they serve. A similar set of steps were used to create the "PointsPerCapita" metric for each county.

ArcGIS Methodology:

A county identification number was used to relate shapefiles to the water violation and poverty. Each county shape is assigned an identification number called a county "FIP" by the US Census Bureau. I copied the FIP code for each county into the excel spreadsheets with water violations and poverty, and I ensured the FIP matched the name of the county for the given characteristic.

In ArcGIS the county shape files were imported and open as map layers. The “Join” tool was used to relate the county FIP with the FIP in the water violation and poverty spreadsheets. Using symbology each “LeadViolationPerCap”, “LeadPtsPerCap” and Poverty Percentage were represented on different layers.

4. Results and Discussion

The following maps show that when comparing the data for general SDWA violations (informal enforcements) and Lead and Copper Rule exceedances (normalized to population) to county poverty, there is no correlation. This lack of correlation is true for both Texas (Figure 4.) and California (Figure 6.). The plots below the maps generated in ArcGIS confirm this lack of correlation. Texas had a coefficient of determination (R^2) of 0.01 (Figure 5.). California had a coefficient of determination of 0.01 (Figure 7.). A list of Texas and California counties by poverty are given in the appendix.

Figure 4. Texas SDWA Violations and Lead and Copper Rule Exceedance and Poverty

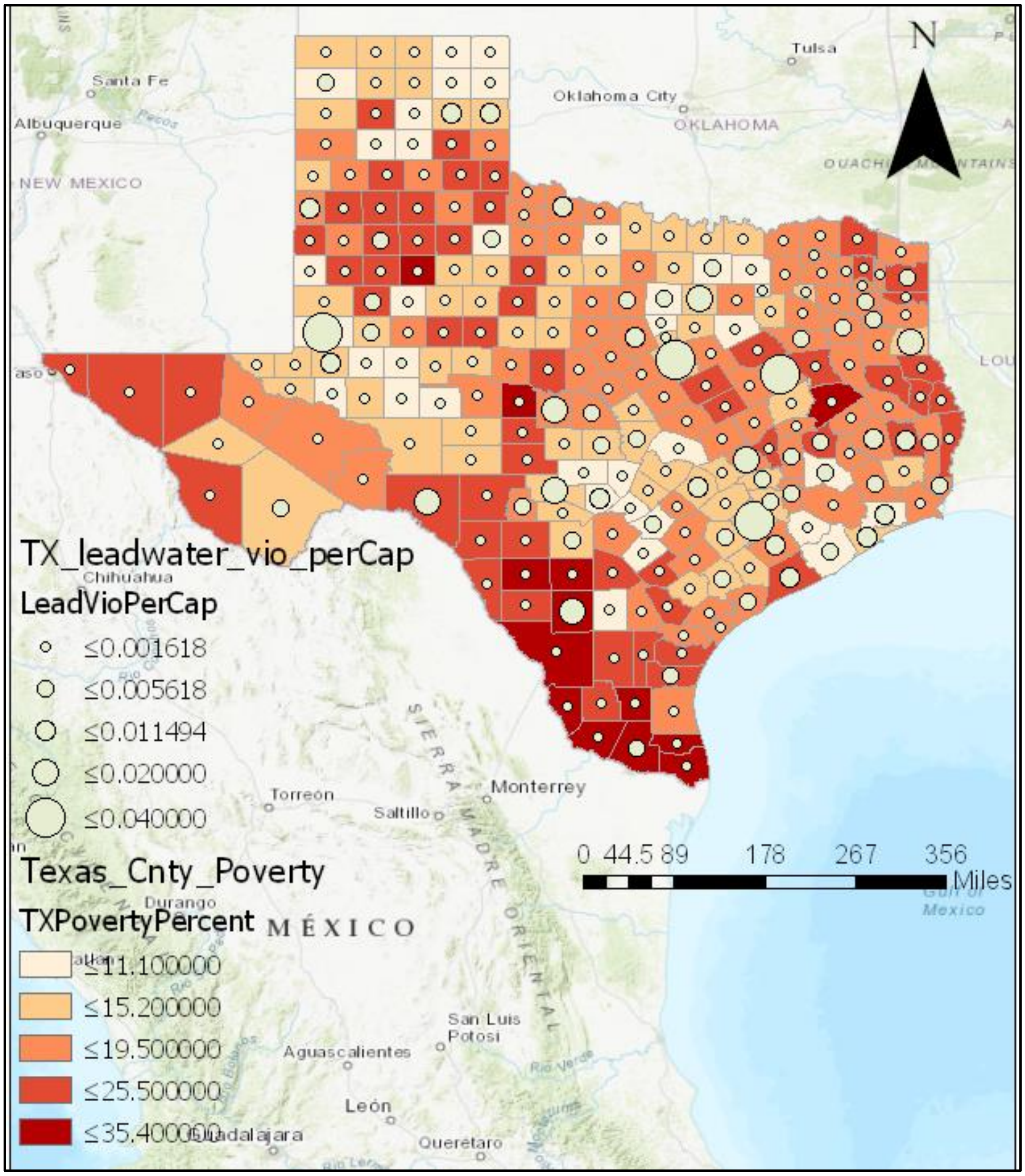


Figure 5. Texas SDWA Violations and Lead and Copper Rule Exceedance and Poverty Plotted

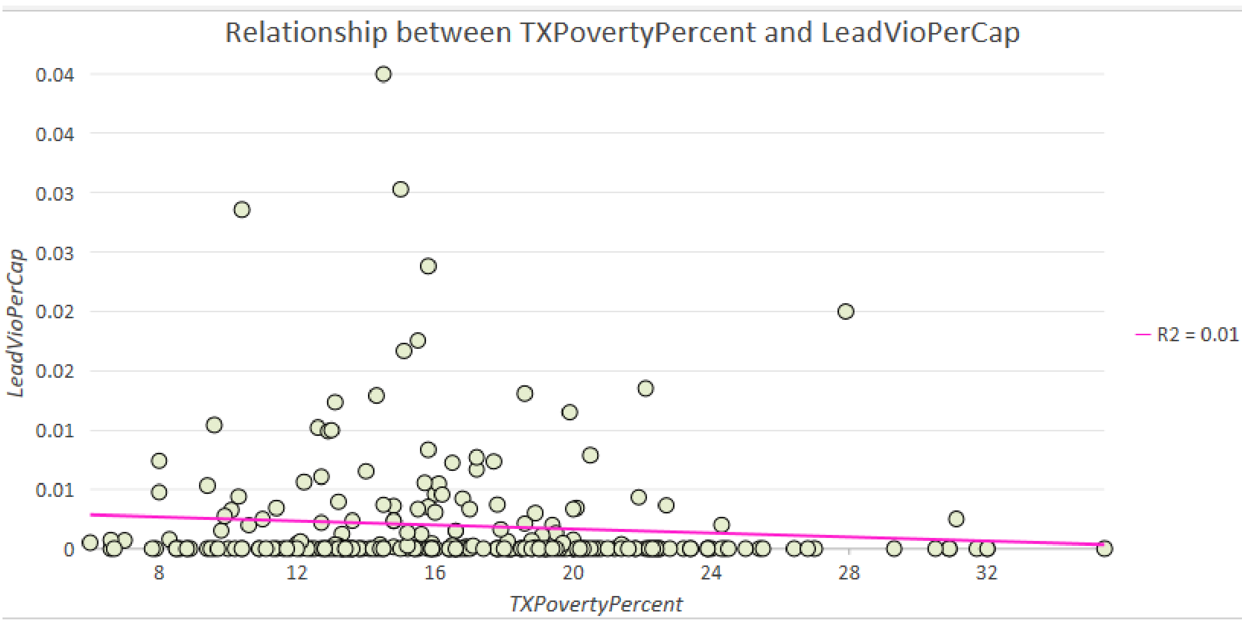


Figure 6. California SDWA Violations and Lead and Copper Rule Exceedance and Poverty

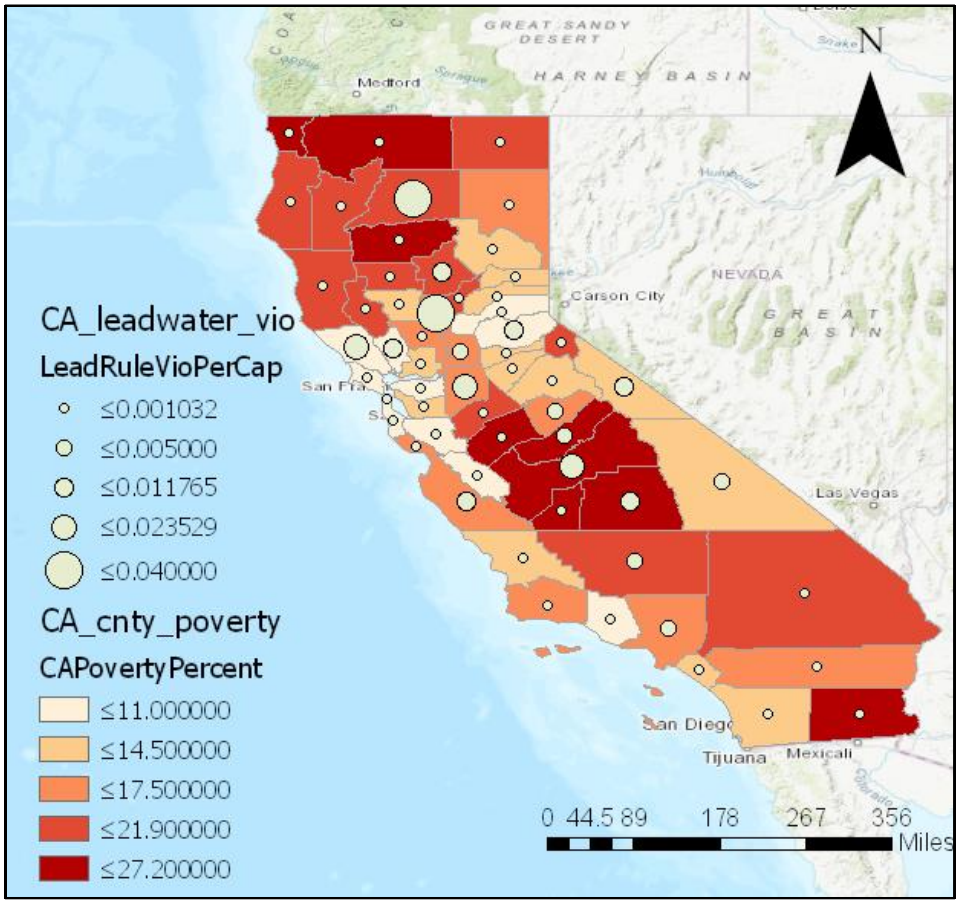
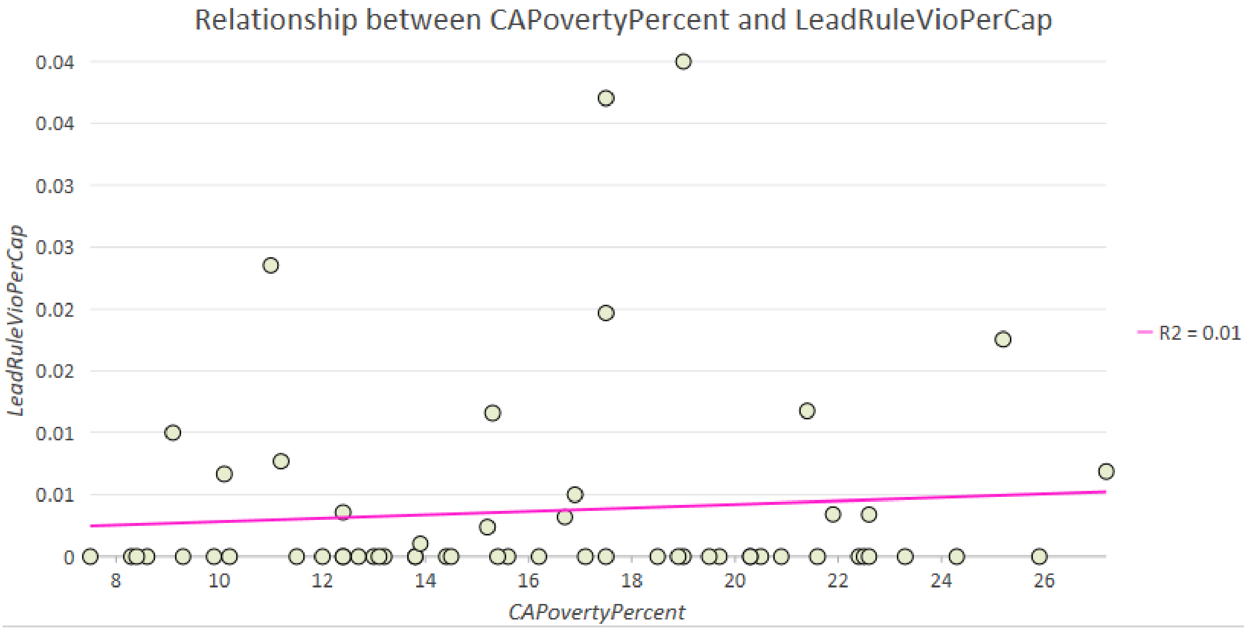


Figure 7. California SDWA Violations & Lead and Copper Rule Exceedance and Poverty Plotted



The following maps show that when comparing the data for SDWA violations points (normalized to population) to county poverty, there is no correlation. This lack of correlation is true for both Texas (Figure 8.) and California (Figure 10.). The plots below the maps generated in ArcGIS confirm this lack of correlation. Texas had a coefficient of determination (R^2) of 0.01 (Figure 9). California had a coefficient of determination of 0.02 (Figure 11).

Figure 8. Texas SDWA Violation Points and Poverty

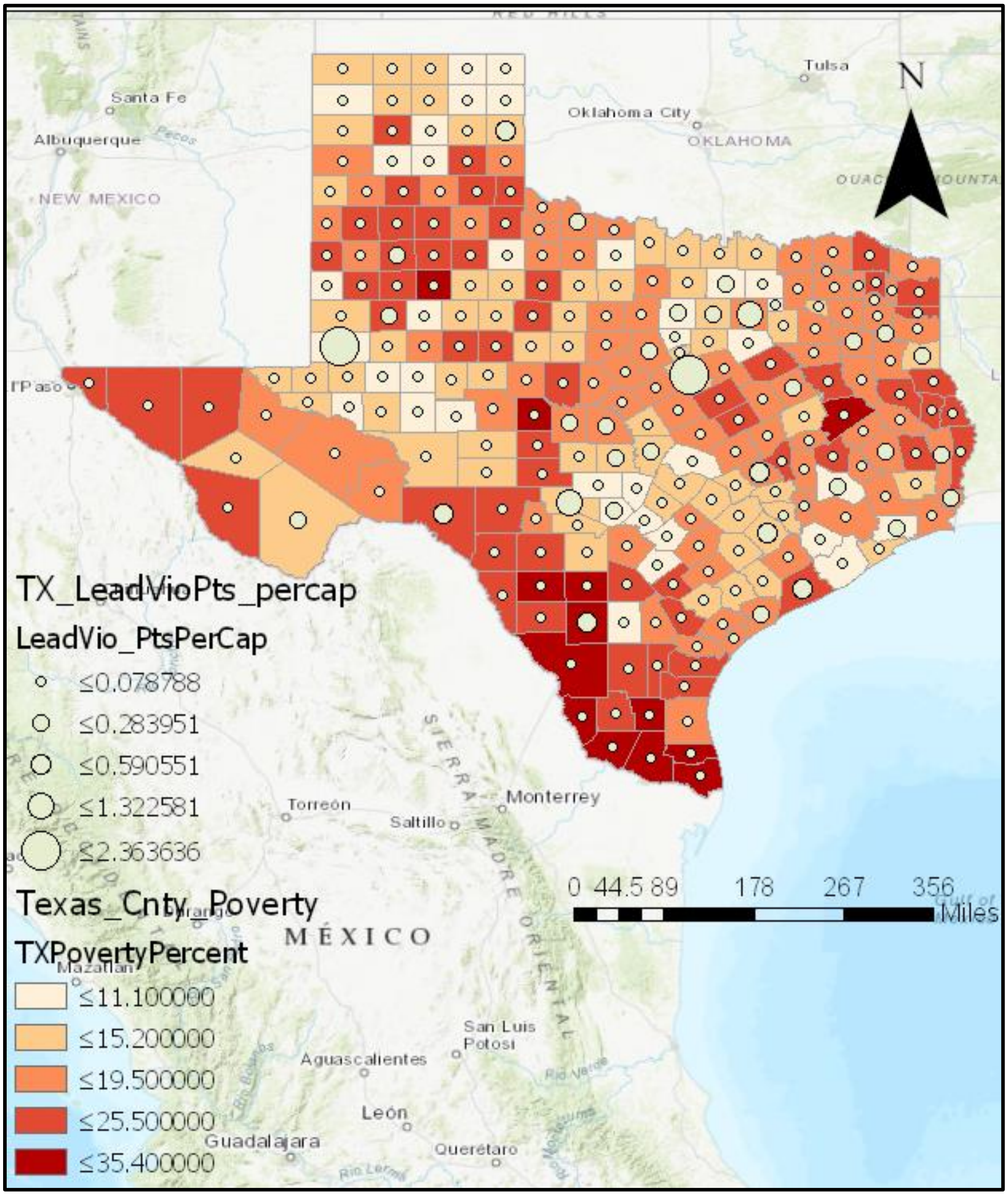


Figure 9. Texas SDWA Violation Points and Poverty Plotted

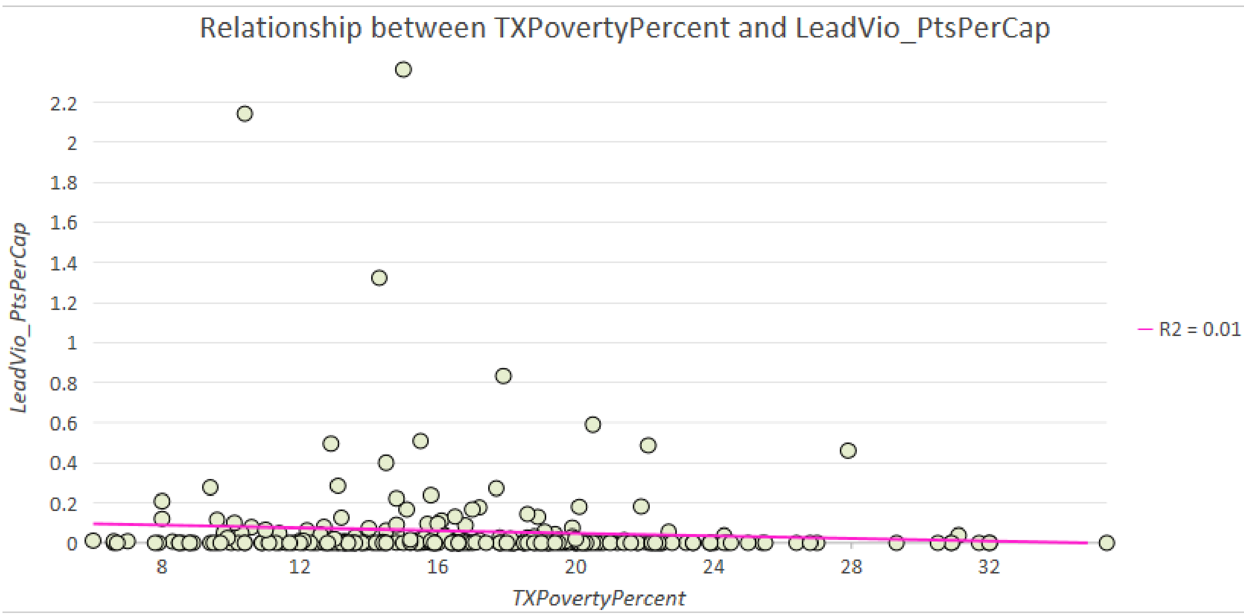


Figure 10. California SDWA Violation Points and Poverty

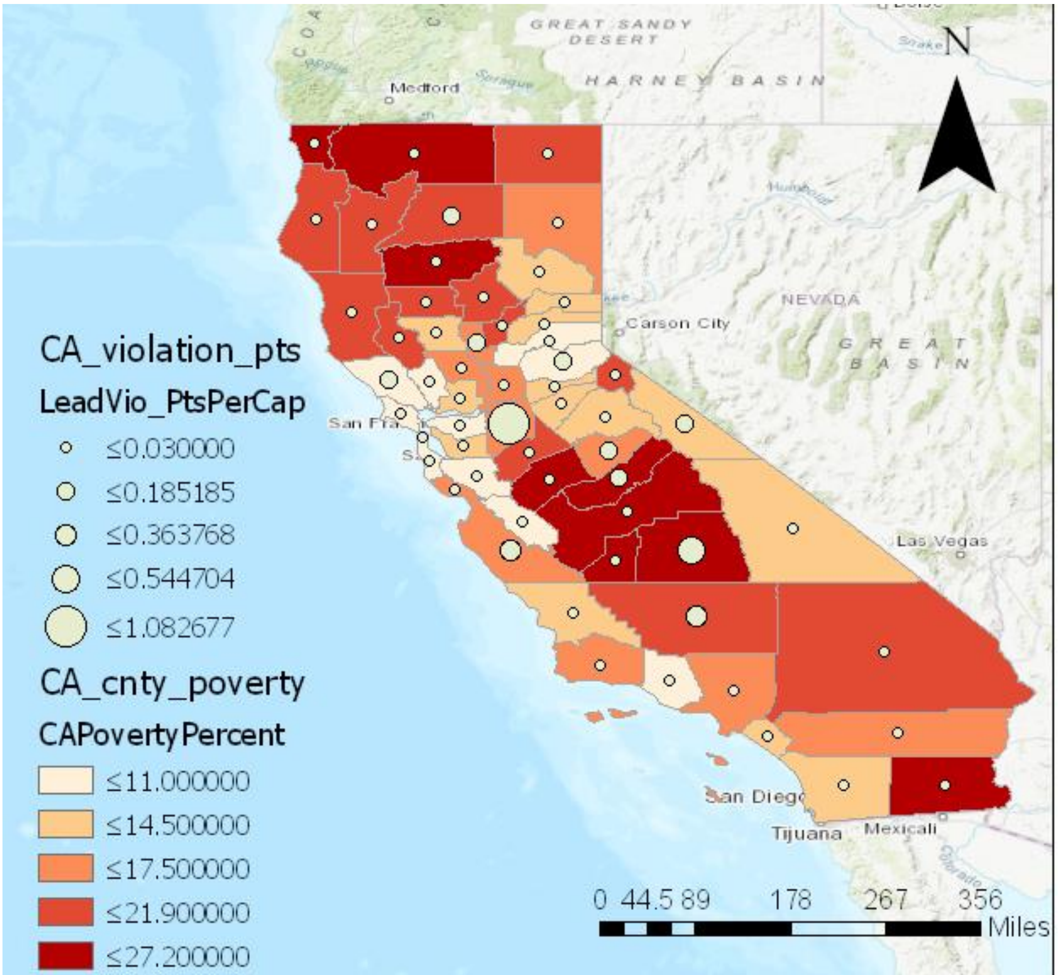
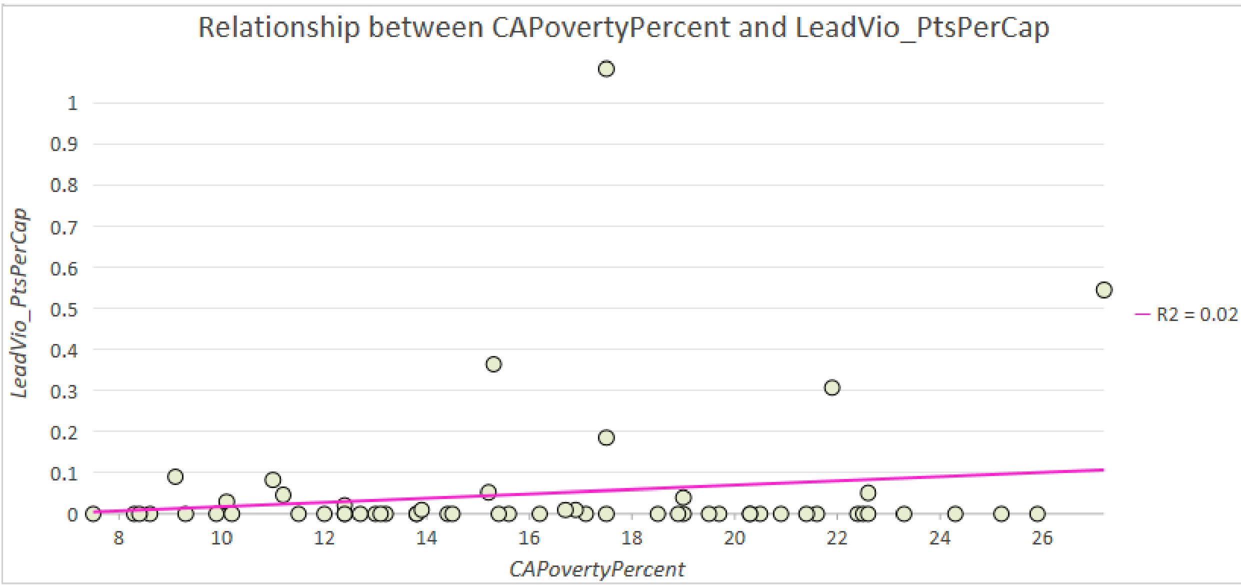


Figure 11. California SDWA Violation Points and Poverty Plotted



The resulting maps and plots show that there is a low correlation between SDWA violations (general and Lead and Copper) and poverty. When using violation points as a proxy for severity of violation, there is still no correlation. Whether this lack of correlation between SDWA violations and poverty is attributed to the overall growing population and economies of Texas and California is still uncertain.

This lack of correlation may be due to the adequacy of the USEPA Drinking Water State Revolving Fund. This fund helps states improve drinking water treatment and infrastructure, based on the regions of the state that are most vulnerable and in need of updates (USEPA n.d.). It is also worth noting that the regions with mid-level poverty percentages (12-20%) tend to have the highest violations (normalized to population) (See plots above). This may indicate that there are counties that are not at the highest level of poverty in Texas and California that need assistance from the USEPA. These counties may currently be overlooked by the Revolving Fund.

5. Conclusions, Limitations, and Recommendations

This study built on previous work by the NRDC by comparing of SDWA violations and poverty at the county level in California and Texas. The results of this study show that in California and Texas there is no correlation between SDWA violations (informal action and Lead and Copper Rule) and poverty at a county level. This result is for informal actions in the past three years and Lead and Copper AL exceedances in the past five years. Additionally, in California and Texas there is no correlation between violation points and county poverty. This lack of correlation potentially means there is no correlation between the poverty at a county level and the amount of SDWA violations or the severity of violations. Whether this is attributed to the growth in Texas and California economies or to the State Revolving Fund is unknown.

This study solely uses poverty as a proxy for cities and counties who may have poor access to resources to improve infrastructure or water treatment. However, there are several other proxies for vulnerability such as income, race, and population density. This reliance on one proxy for vulnerability is not as robust as having a range of metrics. The USEPA ECHO website already has options to download race/ethnicity and population density for a given region in their system. However, this data is not available for every treatment facility. The USEPA should make strides to include this data in each region so that more studies

Another limitation of this study is that it is very restricted temporally. This study only looked at the past three years of informal actions for violations, the past five years for Lead and Copper AL exceedance, and 2015 poverty. A more robust study would look at these values over time to compare changes in poverty to changes in SDWA violations. Additionally, data on which counties received State Revolving Funds would aid in mapping SDWA improvements (or reduction in SDWA violations) for counties over time.

Finally, this study showed that counties with mid-level poverty (12-20%) had some of the highest counts of facilities with violations. These facilities may be overlooked by the State

Revolving Fund. Another study should be done looking at SDWA violations for these mid-level poverty regions, but with more data on the Revolving Fund, more vulnerability metrics, and more temporal variance.

Appendix and References:

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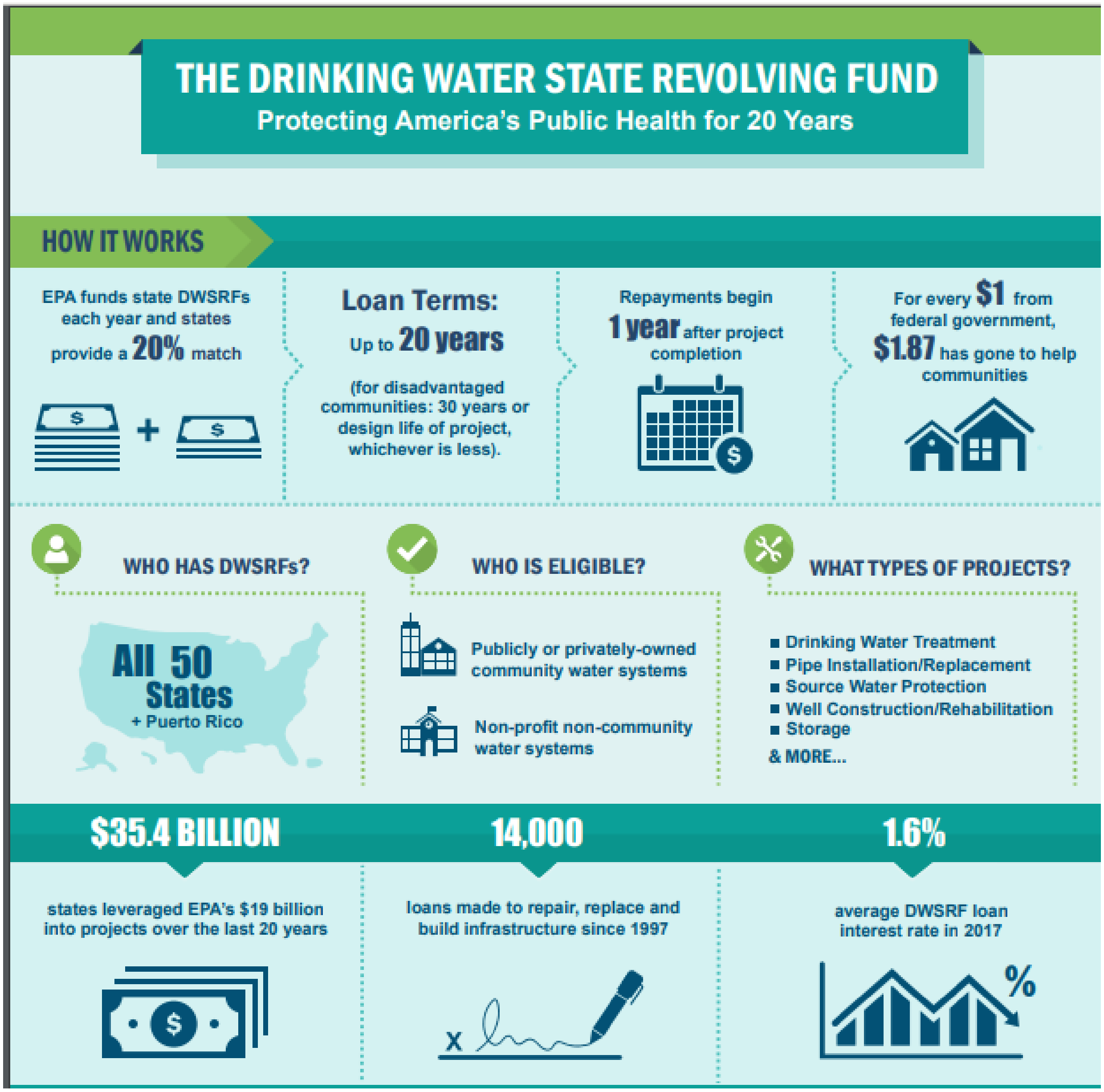
Appendix 1. Drinking Water State Revolving Fund Explained (USEPA n.d.)



Appendix 2. Ranking of California Counties in Terms of 2015 Poverty (USCensusBureau n.d.)

Poverty Ranking	CAPovertyPercent	Cnty_name	LeadRuleVioPerCap	LeadVio_PtsPerCap
1	27.2	Tulare	0.006877579	0.544704264
2	25.9	Merced	0	0
3	25.2	Fresno	0.01754386	0
4	24.3	Imperial	0	0
5	23.3	Del Norte	0	0
6	22.6	Madera	0.003389831	0.050847458
7	22.6	Siskiyou	0	0
8	22.5	Tehama	0	0
9	22.4	Kings	0	0
10	21.9	Kern	0.003412969	0.307167235
11	21.6	Yuba	0	0
12	21.4	Butte	0.011764706	0
13	20.9	Humboldt	0	0
14	20.5	Lake	0	0
15	20.3	Mendocino	0	0
16	20.3	Modoc	0	0
17	19.7	Trinity	0	0
18	19.5	Stanislaus	0	0
19	19	Alpine	0	0
20	19	Shasta	0.04	0.04
21	18.9	San Bernardino	0	0
22	18.5	Glenn	0	0
23	17.5	San Joaquin	0.019685039	1.082677165
24	17.5	Sutter	0.037037037	0.185185185
25	17.5	Yolo	0	0
26	17.1	Lassen	0	0
27	16.9	Sacramento	0.005	0.01
28	16.7	Los Angeles	0.003187251	0.009561753
29	16.2	Riverside	0	0
30	15.6	Santa Barbara	0	0
31	15.4	Santa Cruz	0	0
32	15.3	Monterey	0.011594203	0.363768116
33	15.2	Mariposa	0.002380952	0.052380952
Poverty Ranking	**CAPovertyPercent**	**Cnty_name**	**LeadRuleVioPerCap**	**LeadVio_PtsPerCap**

34	14.5	Tuolumne	0	0
35	14.4	San Luis Obispo	0	0
36	13.9	San Diego	0.001031992	0.009803922
37	13.8	Plumas	0	0
38	13.8	Sierra	0	0
39	13.2	Colusa	0	0
40	13.1	Amador	0	0
41	13	Calaveras	0	0
42	12.7	Orange	0	0
43	12.4	Inyo	0.003571429	0.021428571
44	12.4	Nevada	0	0
45	12.4	San Francisco	0	0
46	12	Solano	0	0
47	11.5	Alameda	0	0
48	11.2	Mono	0.007692308	0.046153846
49	11	Sonoma	0.023529412	0.082352941
50	10.2	Contra Costa	0	0
51	10.1	Napa	0.006666667	0.03
52	9.9	Ventura	0	0
53	9.3	San Benito	0	0
54	9.1	El Dorado	0.01	0.09
55	8.6	Placer	0	0
56	8.4	San Mateo	0	0
57	8.3	Santa Clara	0	0
58	7.5	Marin	0	0

Appendix 3. Ranking of Texas Counties in Terms of 2015 Poverty (USCensusBureau n.d.)

Ranking	TXPovertyPercent	CNTY_name	LeadVioPerCap	LeadVio_PtsPerCap
1	35.4	Willacy	0.0000	0
2	32	Cameron	0.0000	0
3	32	Zavala	0.0000	0
4	31.7	Brooks	0.0000	0
5	31.1	Hidalgo	0.0025	0.0375
6	30.9	Starr	0.0000	0

7	30.9	Zapata	0.0000	0
Ranking	**TXPovertyPercent**	**CNTY_name**	**LeadVioPerCap**	**LeadVio_PtsPerCap**
8	30.5	Webb	0.0000	0
9	29.3	Frio	0.0000	0
10	27.9	La Salle	0.0200	0.46
11	27	Houston	0.0000	0
12	26.8	Garza	0.0000	0
13	26.4	Concho	0.0000	0
14	25.5	Hall	0.0000	0
15	25.4	Duval	0.0000	0
16	25	Hudspeth	0.0000	0
17	24.5	Nacogdoches	0.0000	0
18	24.4	Dimmit	0.0000	0
19	24.3	Kleberg	0.0020	0.036072144
20	24.3	San Augustine	0.0000	0
21	24	Brazos	0.0000	0
22	23.9	Culberson	0.0000	0
23	23.9	Falls	0.0000	0
24	23.9	Maverick	0.0000	0
25	23.4	Bee	0.0000	0
26	23.4	Marion	0.0000	0
27	23.2	Jim Hogg	0.0000	0
28	22.8	Crosby	0.0000	0
29	22.7	Walker	0.0036	0.054545455
30	22.5	Cochran	0.0000	0
31	22.5	Terry	0.0000	0
32	22.4	Potter	0.0000	0
33	22.4	Presidio	0.0000	0
34	22.3	Childress	0.0000	0
35	22.3	Haskell	0.0000	0
36	22.2	Dickens	0.0000	0
37	22.2	Edwards	0.0000	0
38	22.1	Jim Wells	0.0000	0
39	22.1	Val Verde	0.0135	0.486486486
40	21.9	Dawson	0.0043	0.181818182
41	21.8	Floyd	0.0000	0
42	21.8	Lamb	0.0000	0
43	21.6	Swisher	0.0000	0
44	21.4	Cottle	0.0000	0
45	21.4	Jones	0.0004	0.014224751

Ranking	TXPovertyPercent	CNTY_name	LeadVioPerCap	LeadVio_PtsPerCap
46	21.2	Newton	0.0000	0
47	21	Anderson	0.0000	0
48	20.8	Menard	0.0000	0
49	20.7	Uvalde	0.0000	0
50	20.6	Kinney	0.0000	0
51	20.5	Lynn	0.0000	0
52	20.5	Matagorda	0.0079	0.590551181
53	20.4	Atascosa	0.0000	0
54	20.3	El Paso	0.0000	0
55	20.3	Hale	0.0000	0
56	20.2	Donley	0.0000	0
57	20.2	Red River	0.0000	0
58	20.1	Lubbock	0.0034	0.180159635
59	20.1	Titus	0.0000	0
60	20	Cass	0.0033	0.02
61	20	Coleman	0.0000	0
62	20	Karnes	0.0000	0
63	20	Kimble	0.0000	0
64	20	Nolan	0.0007	0.005231689
65	19.9	McLennan	0.0002	0.030666667
66	19.9	Nueces	0.0003	0.012260967
67	19.9	Tyler	0.0115	0.074712644
68	19.8	Shelby	0.0000	0
69	19.7	Mitchell	0.0005	0.008636364
70	19.7	Sabine	0.0000	0
71	19.6	Navarro	0.0000	0
72	19.5	Morris	0.0000	0
73	19.5	Trinity	0.0013	0.015717092
74	19.4	Deaf Smith	0.0000	0
75	19.4	Real	0.0020	0.042168675
76	19.3	Reeves	0.0000	0
77	19.2	De Witt	0.0000	0
78	19.2	Knox	0.0000	0
79	19.2	Madison	0.0000	0
80	19.1	Howard	0.0000	0
81	19.1	Limestone	0.0011	0.05433569
82	19	Cherokee	0.0000	0
83	19	Collingsworth	0.0000	0
84	18.9	San Saba	0.0030	0.129129129
85	18.9	Wichita	0.0001	0.000184997

86	18.8	Camp	0.0000	0
87	18.8	Castro	0.0000	0
Ranking	**TXPovertyPercent**	**CNTY_name**	**LeadVioPerCap**	**LeadVio_PtsPerCap**
88	18.8	Lamar	0.0007	0.030976431
89	18.6	Bowie	0.0000	0
90	18.6	McCulloch	0.0131	0.14379085
91	18.6	Palo Pinto	0.0021	0.027542373
92	18.5	Delta	0.0000	0
93	18.5	Harrison	0.0000	0
94	18.5	Runnels	0.0000	0
95	18.2	Aransas	0.0000	0
96	18.2	Brown	0.0000	0
97	18.2	Stephens	0.0000	0
98	18.1	Eastland	0.0006	0.022022333
99	18.1	Pecos	0.0000	0
100	18.1	San Jacinto	0.0000	0
101	18	Hardeman	0.0000	0
102	17.9	Angelina	0.0000	0
103	17.9	Dallas	0.0016	0.833333333
104	17.8	Caldwell	0.0000	0
105	17.8	Foard	0.0000	0
106	17.8	Grimes	0.0037	0.027777778
107	17.8	Hill	0.0000	0
108	17.7	Erath	0.0074	0.272058824
109	17.4	Baylor	0.0000	0
110	17.2	Polk	0.0077	0.176923077
111	17.2	Wharton	0.0067	0.013333333
112	17.1	Jack	0.0002	0.002247191
113	17	Gregg	0.0033	0.166666667
114	17	Motley	0.0000	0
115	16.9	Jefferson	0.0002	0.00247599
116	16.9	Milam	0.0000	0
117	16.8	Calhoun	0.0042	0.08649789
118	16.8	Comanche	0.0000	0
119	16.7	Terrell	0.0000	0
120	16.6	Briscoe	0.0000	0
121	16.6	Harris	0.0015	0.020186217
122	16.6	Mills	0.0000	0
123	16.6	Robertson	0.0000	0
124	16.6	Rusk	0.0000	0
125	16.6	Wood	0.0015	0

126	16.5	Hunt	0.0003	0.003494624
127	16.5	Kenedy	0.0000	0
Ranking	**TXPovertyPercent**	**CNTY_name**	**LeadVioPerCap**	**LeadVio_PtsPerCap**
128	16.5	Wilbarger	0.0072	0.130434783
129	16.4	Fannin	0.0000	0
130	16.4	Franklin	0.0000	0
131	16.4	Gonzales	0.0000	0
132	16.2	Henderson	0.0046	0.03652968
133	16.1	Orange	0.0055	0.110807114
134	16	Coryell	0.0000	0
135	16	Smith	0.0031	0.094801223
136	16	Waller	0.0046	0.056574924
137	15.9	Bell	0.0004	0.003433476
138	15.9	Hockley	0.0000	0
139	15.9	Hopkins	0.0000	0
140	15.9	Van Zandt	0.0000	0
141	15.8	Bailey	0.0083	0.008333333
142	15.8	Freestone	0.0238	0.238095238
143	15.8	Liberty	0.0035	0.06
144	15.8	Live Oak	0.0000	0
145	15.7	Jasper	0.0055	0.094182825
146	15.6	Bexar	0.0003	0.001461573
147	15.6	Tom Green	0.0012	0.022629969
148	15.5	Burleson	0.0175	0.50877193
149	15.5	San Patricio	0.0000	0
150	15.5	Upshur	0.0033	0.02
151	15.4	Hamilton	0.0000	0
152	15.4	Refugio	0.0000	0
153	15.2	Fisher	0.0000	0
154	15.2	Grayson	0.0003	0.002336449
155	15.2	Montague	0.0013	0.016129032
156	15.1	Panola	0.0167	0.166666667
157	15	Bosque	0.0303	2.363636364
158	15	Young	0.0000	0
159	14.8	Brewster	0.0023	0.221445221
160	14.8	Llano	0.0024	0.089411765
161	14.8	Medina	0.0036	0.039426523
162	14.8	Taylor	0.0001	0.000963192
163	14.5	Colorado	0.0400	0.4
164	14.5	Parmer	0.0000	0
165	14.5	Stonewall	0.0000	0

166	14.5	Washington	0.0037	0.060941828
167	14.4	Moore	0.0000	0
168	14.4	Rains	0.0003	0.005065856
Ranking	**TXPovertyPercent**	**CNTY_name**	**LeadVioPerCap**	**LeadVio_PtsPerCap**
169	14.3	Kerr	0.0129	1.322580645
170	14.3	Loving	0.0000	0
171	14.2	Hutchinson	0.0000	0
172	14.1	Goliad	0.0000	0
173	14	Galveston	0.0065	0.07173913
174	13.9	Lampasas	0.0000	0
175	13.8	Leon	0.0000	0
176	13.8	Mason	0.0000	0
177	13.6	Hays	0.0000	0
178	13.6	Jackson	0.0000	0
179	13.6	Throckmorton	0.0000	0
180	13.6	Victoria	0.0023	0.030530766
181	13.5	Coke	0.0000	0
182	13.5	Upton	0.0000	0
183	13.4	Oldham	0.0000	0
184	13.4	Schleicher	0.0000	0
185	13.3	Bandera	0.0012	0.008631319
186	13.3	Gaines	0.0000	0
187	13.3	Jeff Davis	0.0000	0
188	13.3	Winkler	0.0000	0
189	13.2	Burnet	0.0039	0.125
190	13.2	Cooke	0.0000	0
191	13.2	Travis	0.0002	0.00597767
192	13.1	Kaufman	0.0000	0
193	13.1	Shackelford	0.0003	0.000661376
194	13.1	Tarrant	0.0123	0.283950617
195	13	Callahan	0.0000	0
196	13	Gray	0.0100	0.02
197	12.9	Crockett	0.0000	0
198	12.9	Wheeler	0.0099	0.495049505
199	12.8	Sherman	0.0000	0
200	12.8	Ward	0.0000	0
201	12.7	Austin	0.0022	0.056830601
202	12.7	Bastrop	0.0061	0.078787879
203	12.7	Scurry	0.0000	0
204	12.6	Ector	0.0102	0.040816327

205	12.5	Sutton	0.0000	0
206	12.4	Lee	0.0000	0
207	12.3	Clay	0.0000	0
Ranking	**TXPovertyPercent**	**CNTY_name**	**LeadVioPerCap**	**LeadVio_PtsPerCap**
208	12.2	Lavaca	0.0056	0.061797753
209	12.1	Somervell	0.0000	0
210	12.1	Wise	0.0006	0.010771993
211	12	Dallam	0.0000	0
212	12	Fayette	0.0004	0.009846396
213	11.8	Hardin	0.0000	0
214	11.7	Hansford	0.0000	0
215	11.6	Sterling	0.0000	0
216	11.4	Johnson	0.0000	0
217	11.4	Martin	0.0034	0.047945205
218	11.3	Kent	0.0000	0
219	11.1	Yoakum	0.0000	0
220	11	King	0.0025	0.064676617
221	10.9	Blanco	0.0000	0
222	10.9	Ellis	0.0000	0
223	10.6	Brazoria	0.0020	0.078389507
224	10.4	Andrews	0.0286	2.142857143
225	10.4	Armstrong	0.0000	0
226	10.4	Gillespie	0.0000	0
227	10.3	Guadalupe	0.0044	0.048245614
228	10.2	Borden	0.0000	0
229	10.1	Montgomery	0.0033	0.09941067
230	10	McMullen	0.0000	0
231	9.9	Hartley	0.0027	0.024657534
232	9.8	Hood	0.0015	0.050989346
233	9.7	Lipscomb	0.0000	0
234	9.6	Chambers	0.0104	0.114583333
235	9.6	Crane	0.0000	0
236	9.5	Archer	0.0000	0
237	9.4	Parker	0.0053	0.276595745
238	9.4	Wilson	0.0000	0
239	8.9	Midland	0.0000	0
240	8.8	Ochiltree	0.0000	0
241	8.8	Reagan	0.0000	0
242	8.6	Hemphill	0.0000	0
243	8.5	Carson	0.0000	0
244	8.5	Randall	0.0000	0

245	8.3	Comal	0.0008	0.007103394
246	8	Denton	0.0048	0.119047619
247	8	Kendall	0.0074	0.207407407
248	7.9	Irion	0.0000	0
249	7.8	Glasscock	0.0000	0
250	7	Fort Bend	0.0007	0.008391769
251	6.7	Roberts	0.0000	0
252	6.6	Collin	0.0007	0.00862069
253	6.6	Williamson	0.0000	0
254	6	Rockwall	0.0005	0.011374876