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A Qualitative Study of an Environmental Justice Fight in a Freedman Community:
A Content Analysis of Sand Branch, Texas

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Abstract

Sand Branch is an unincorporated community and the poorest in Dallas County, Texas. This community was established in 1878 and today lacks the most basic resource, clean water. The environmental justice movement aims to rectify problems that impact the environment of mostly minority and low-income communities and establish policy and regulations that protect persons from different races, ethnicities, and incomes. Procedural justice focuses specifically on the fairness of government practices and decision-making by public or private actors. This study seeks to ascertain the issues facing the Sand Branch community as identified by residents of the community; past and current policies and governmental entities, which have prevented rectification; and the remedies and redress required. The study design includes a content analysis and thematic decomposition analysis of video recorded interviews and conversations of Sand Branch residents as they discuss the water issues they have experienced for more than 30 years; the impact on their quality of life; and their understanding of the conflicting federal and local policies that prevent them from implementing solutions. The researchers also focus on the history of marginalized communities, which face greater environmental justice issues that impact quality of life.

Keywords: environmental justice, green criminology, environmental racism, content analysis, procedural justice, thematic analysis

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Environmental issues concerning ecological additions (e.g., water pollution) continue to remain a global issue. Yet, the consequences of these criminal and harmful actions are disproportionality distributed across world societies (Lynch, Long, Stretesky, & Barrett, 2017; Simon, 2000). Current empirical research posits that varying types of pollutions and environmental harms in the US and the subsequent adverse medical and health-related issues are disparate among lower socio-economic, ethnic, and racial minority groups (Bullard, 2018; Lester, 2018). The disproportionate impact of environmental harms and associated health risks has fostered the rise of environmental and social justice movements among these groups (Taylor, 2000).

Progress has been made to rectify environmental injustices in the US since the nation's first landmark environmental racism protest against the placement of a PCB landfill in Warren County, North Carolina in 1982 (Bullard, 2018); however, inequities in environmental risk and benefits still remain in many parts of the United States nearly 30 years later. One such location, and the subject of this research, is the Freedman's town of Sand Branch, Texas which currently does not have access to clean running water placing residents under undue hardships and exposing them to additional health risks. An injustice, the residents believe, was caused by the city of Dallas placing a water treatment facility that contaminated their well water, which has historically been the community's primary water source since its founding (Savali, 2017).

This study uses a content analysis of (*n* = 23) YouTube videos and news articles. The primary research questions guiding this study are 1) What are the key terms linked to environmental injustice in Sand Branch, Texas?, 2) How are the lived experiences of Sand Branch residents described based on the Bing Sentiment Lexicon?, and 3) How do individuals perceive environmental injustice in Sand Branch, Texas.

Literature Review

Environmental Justice/Environmental Racism/Procedural Justice

Environmental injustice refers to environmental disparities based on race, ethnicity, and class (Lester, 2018). Environmental racism, a term first used by Reverend Benjamin Chavis in 1987, describes not only the conscious decisions to place toxic waste plants and other life threatening pollutants in minority communities but also the lack of minorities voice to fight the injustices (Stephens, 1996). According to the U.S. Environmental Protection Agency, "Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulation, and policies" (2018, n.p.). Empirical research has continuously supported the relationships between race, social class, and environmental risks and benefits (Bullard, 2018; Lester, 2018; Lynch et al., 2017). Environment justice research examining the socio-spatial distributions of varying types of hazardous industries provides substantial empirical evidence over two decades. Examples of the disproportionate presence include toxic industries, water treatment plants, and waste dumpsites (Bullard, 2000) in minority and improvised communities in the US; as these groups often lack the social capital to resist these hazards (Commission for Racial Justice, 1987; Lester, 2018). This disparity is even more salient among southern states stemming from historical and racially biased institutional practices that place minorities at a disadvantage and produce environmental inequalities, particularly against black citizens (Grove et al., 2018; Bullard, 2018), even when controlling for income (Lester, 2018).

Other researchers have suggested that environmental decisions may be more reflective of where white people geographically reside compared with where minority communities live under the

guise of white privilege (Pulido, 2000; Pulido, 2015). Whereas white people are often sheltered and isolated from environmental hazards, minorities are exposed at greater rates (Pulido, 2015). Procedural justice focuses specifically on the fairness of government practices and decision-making by public or private actors (Heydon, 2018). For equitable decisions to be made about the placement of hazardous facilities and pollutants, three factors must be present: the ability to participate in decision-making; the opportunity to provide information and input; the capability to accomplish what is needed (George & Reed, 2017).

Still, some researchers have noted other factors may account for the correlation between socio-demographics and the placement of hazardous facilities and pollutants including land prices, zoning ordinances and policies, and the lack of social capital (Lester, 2018). These factors are also evidence of environmental racism. Numerous studies have documented the discriminatory and biased policies favoring predominately white and economically advantaged individuals across specific locations. For instance, Bullard (1983) examined disparities in solid waste sites in Houston, Texas (1983). Bolin, Grineski, & Colllins (2005) described how racially biased policies created an ad-hoc segregated and economically deprived community in South Phoenix, AZ; and Boone, Buckley, Grove, and Sister (2009) addressed the inequitable distribution of parks in Baltimore, Maryland.

Environmental racism, describes planners' inequitable distribution of the location of hazardous waste or toxic plants, including water treatment plants, utilizing a cost-benefit analysis (Collin, Beatley, and Harris, 1995; Arp, III & Llorens, 1999). This utilitarian approach considered the cost of locating a hazardous waste facility based upon the areas of least resistance and cost of land, often identified as low income and minority communities.

Recently, Butler, Scammell, and Benson (2016) conducted a case study on the water crisis in Flint, Michigan. Importantly, these aforementioned disparities bestow environmental burdens and health hazards inequitably among lower-income and racial minorities including air pollutants such as nitrous oxides and carbon monoxide (Chakraborty, 2009; Grineski, Bolin, Boone, 2007); exposure to industrial air toxins (Zwickl, Ash, & Boyce, 2014); toxic waste (Hipp & Lakon, 2010); and access to safe drinking water (Butler et al., 2016). Furthermore, exposure to these hazards can lead to increased health related issues. For instance, Chakraborty (2009) associated traffic-related pollutants to increased cancer and respiratory risks.

The environmental justice literature also discusses drinking water disparities: lack of access to infrastructure is the impetus to lack of access to safe drinking water. Balazs & Ray (2014) highlight the research on the conditions that correlate to unsafe drinking water, including "selective enforcement of drinking water regulations, noncompliance with federal standards, inequities in access to funding, and the absence of a community's political power" (p. 603). In addition, the unincorporated communities located in the United States and its territories are more likely to be denied access to basic services as municipalities determine whether to annex or exclude these communities from their city boundaries.

The government plays the most important role in the water supply infrastructure in the United States. The federal government regulation policies, pertaining to water quality and access to sources of water, serves as the oversight agency for water quality, treatment, and monitoring systems; offers technical assistance and training; and allocates resources to repair and upgrade physical infrastructure (VanDerslice, 2011). State governments own or contract nearly 16,000 water treatment plants that serve about 75% of the US population (Lynch, Stretesky & Long, 2017). The paradoxical relationship of wastewater treatment plants has only recently emerged. Publicly owned treatment plants, charged with treating the wastewater from 234 million homes, legally discharge polluted water into waterway ecosystems of the area surrounding the plants (Lynch, et al., 2017).

Enforcement of federal standards that regulate emissions from wastewater treatment plants is the role of state government. These standards are rarely enforced (Earnhardt, 2004). As discussed, many unincorporated neighborhoods are low-income minority communities adversely affected by many environmental justice issues such as the decision to locate wastewater treatment plants in their community (Heaney, Wilson, Wilson, Cooper, Bumpass & Snipes, 2011).

In the United States, piped water is provided to the homes of over 99% of the population (VanDerslice, 2011), but 13 million of those homes depend upon private wells (US Census American Housing Survey, 2015). Although the Environmental Protection Agency provides information on how to test, treat, or remove contaminants from private wells and stresses the importance of testing, the agency does not regulate or set standards for safe drinking water in private wells (Environmental Protection Agency: Private Drinking Wells, 2018). Many people who rely on private wells reside in unincorporated communities, which lack jurisdiction, zoning designations and joint planning agreements.

Neal, Lukasiewicz, & Syme (2014) posit that because water is essential to life, justice matters in water governance. However, the unequal distribution of societal power affects those with low economic capacity negatively and can result in the perpetuation of burdens on disempowered groups, leading to environmental injustices. In Lynch, et al.'s study (2017) of emissions from publicly owned wastewater treatment plants across all US states, they concluded the plants' discharge of pollutants into the waterways was significant enough to cause "ecological disorganization" (p. 7). Although the Safe Drinking Water Act (SDWA) of 1974 gave authority to the EPA to create federal standards for drinking water quality, the states are responsible for monitoring and enforcing the regulations, as Earnhart (2004) noted in his research of publicly owned treatment plants in Kansas, these standards were rarely enforced over a nine-year period. In their review of the EPA's emission data from publicly owned water treatment plants in 48 states, Lynch, et al. (2017) concluded that these plants emitted large unhealthy quantities of pollutants. The plants, like the wastewater treatment plant built near Sand Branch, served as a conduit for the pollutants.

Brief History of Sand Branch

The Census Bureau defines census designated places (CDPs) as "geographic entities representing closely settled, unincorporated communities that are locally recognized and identified by name" (Department of Commerce Bureau of the Census, 2018, p. 6934). All population minimum requirements for CDPs were eliminated in order to mimic the requirement for incorporated places, which has never had a required population size. The 2010 Census identified more than 38.7 million people living in CDPs located in the United States, and its territories. Several of these areas, known as colonias, are located along the U.S. and Mexico border and lack utilities, paved roads, and other infrastructure (Department of Commerce Bureau of the Census, 2018). Although research has been conducted on the social inequities found in unincorporated colonias compared to incorporated communities (Schoolmaster, 1993; Parch & Humberson, 2009; and Durst & Ward, 2015), only a limited amount of local media attention has been given to the small-unincorporated community of Sand Branch. Sand Branch faces many of the same inequities of colonias and is located just a few miles from one of the wealthiest cities in the United States.

Located 14 miles south of Dallas, Texas, Sand Branch, Texas, sometimes spelled Sandbranch, formed as a Freedman's town in 1878. Its highest population in 1985 registered at 500 residents, but currently less than 100 people live in Sand Branch. According to the United Census Bureau, the Median household income in Dallas from 2012-2016 was $51,411 (2018), yet most of the residents of Sand Branch have incomes well below the federal poverty line, with an average annual individual income of $8,652. Several areas of environmental injustice have affected the Dallas County community of Sand Branch. The houses were never equipped with water or sewer

lines and the residents have never had trash collection services or streetlights. Families built and maintained their own private wells. In the 1970s, gravel mining began next to Sand Branch. Although residents filed a lawsuit to stop the digging, the suit was dismissed in 1979 (West, 1985).

The poor and mostly black community did not have the protection of a local government to advocate on behalf of its residents, when the county elected to place a large wastewater treatment plant less than 3 miles from the 500 residents living in Sand Branch. After the plant began operations, Sand Branch residents, who relied on private well water, found their water contaminated and unsafe to drink (West, 1985). The surrounding towns, including the city of Dallas, took no action to pipe municipally treated water to the homes located in the unincorporated community of Sand Branch, leaving the community with no viable means of acquiring drinking water other than purchasing bottled water from the nearest store (Shine, 2016). Water analysis revealed the water was contaminated (West, 1985) but governmental entities did not agree the wastewater treatment plant was the cause (Milman, 2017). Instead, they pointed to hogs owned by community residents and absentee landlords. The residents balked at the claim that the livestock, a part of Sand Branch since its beginnings, could cause all the private wells to become contaminated.

With contamination of the wells, the struggle to obtain safe drinking water began in 1985 and continues more than 30 years later. In 2005, an attempt was made by the county to buy the homes and relocate the residents. Thirty-six families responded, but after receiving money for their homes, residents were responsible for home demolition fees and were left with only $350 to relocate (Savali, 2016). When faced with another buyout program in 2016, residents cited the 2005 buyout where homeowners gave up homes with either a very small or no mortgage in exchange for an amount which would not even cover the cost of a one-month apartment rental. Community members continue to find their quality of life greatly compromised due to the lack of uncontaminated water for themselves, their crops, and their livestock.

Methodology
This study uses a content analysis of (*n* = 23) YouTube videos and news articles. The primary research questions guiding this study are 1) What are the key terms linked to environmental injustice in Sand Branch, Texas?, 2) How are the lived experiences of Sand Branch residents described based on the Bing Sentiment Lexicon?, and 3) How do individuals perceive environmental injustice in Sand Branch, Texas.

Consistent with best practices (Elo & Kyn, 2007), content analysis is a widely accepted qualitative research technique conducted to derive meaning from written and oral artifacts such as newspapers and videos (Hseih & Shanon, 2005; Saldana, 2013) in order to gain further understanding and knowledge about a particular phenomenon (Weber, 1990). A valid use is considering social injustice regarding access to clean drinking water and government placement of water treatment plants. While used heavily in the fields of communication and health (Hseih & Shanon, 200; Elo & Kyngas, 2007), content analysis has also been used in environmental justice research to examine several environmental and green criminological topics (Saldana, 2013). Given this study is focused on interpreting meaning and themes relating to perceptions of environmental injustice derived through a content analysis of media artifacts, this theoretical approach provides a well-established methodology and valid approach to examining this topic (Hseih & Shanon, 2005;Saldana, 2013).

The Bing Sentiment Lexicon (Liu, 2012) is a widely used pairing of words using a small set of factors derived from Pluthick's Wheel of Emotion (1980) through a crowdsourced framework. This lexicon is the primary framework for further analysis within the context of this study. The validity of

the Bing Sentiment Lexicon as an analytical foundation is that it provides an objective connection between word and sentiment based on the perception of a statistically representative subset of content consumers. For quantitatively oriented content analysis, this objective standard is necessary to provide validity since the qualitative analytical narrative is missing.

Data Collection

Researchers conducted a search for media relating to Sand Branch, Texas and the lack of access to clean drinking water. The artifacts collected for this study included newspapers and online videos. Utilizing the terms [[“Sand Branch” or “Sandbranch” or “Dallas Freedmen’s town”] and [“Environmental Justice” or “Water Treatment Plant”]]. the authors searched Youtube.com, common search engines (i.e. Google, Bing, and Yahoo), as well as Newspaper Source Complete and LexisNexis dating between 1980 and 2018. Only one data item extended beyond a local or state level publication. All remaining articles were published in local or state newspapers and magazines. The videos found were produced by local newscasts or local groups and individuals recording the plight of Sand Branch. After reviewing the printed articles and viewing videos, 12 printed articles and 11 videos were selected based on relevancy to the study. Criterion for the selection included a story pertaining to recent or historical struggles of Sand Branch’s residents, quality of life and health issues, environmental issues, or the water treatment plant.

Content Analysis

This research paper used a three-part analytic approach. First, unformatted texts of the videos and articles were systematically analyzed to examine word frequency and patterns. Next, researchers matched data text with words taken from the Bing Sentiment Lexicon (Liu, 2012). Lastly, using a predetermined framework based on Plutchik’s Wheel of Emotion (Plutchik, 1980), researchers analyzed data through open coding to examine how perceptions of the environmental injustice in Sand Branch were expressed and to identify any potential subthemes.

	The videos were analyzed using their automatically generated transcripts. The transcripts and unformatted articles were then arranged into a single data table. The columns detail the retrieved URL, the posted date, the listed title, the author, and the body of the text. Data that was discarded was the timestamp in the transcripts; since there is not an equivalent timing mechanism for printed articles, it was removed in favor of uniformity. One of the video transcripts was flagged as potentially being funded by a foreign government and might not be trustworthy, but the video itself was not auto generated, included actual video of Sand Branch residents, and was still part of the discussion; the warning was disregarded for the purposes of this analysis. Dates, which were only listed by month (for example, in monthly publications), were rounded to the 15th of the month for the sake of uniformity. One article (“Strategic Vision and Plan for Improvements to the Sandbranch Community”) was saved in a format that could not be automatically extracted, so it was transcribed manually and double-checked; errors of transcription may remain. This process yielded a table that was uniform in attributes for each artifact and exposed the content to a text-based analysis. The final articles are included in Table 1.

Table. 1

Videos and News Article Sources

VIDEOS	Source
VSource1	*Sand Branch Water Crisis*
VSource2	*The Lost City of Sand Branch*
VSource3	*USA: Texas Village Struggles with Lack of Water Supply for 30 Years*
VSource4	*Serving in Sand Branch*

VSource5	*No Drinking Water in Dallas County, Texas, USA?*
VSource6	*Sandbranch Community Wants Running Water from Dallas County*
VSource7	*Baylor Brings Holiday Cheer to the Sand Branch Community*
VSource8	*America's Dirty Little Secret: The Texas Town that has been without Running Water for Decades*
VSource9	*Sand Branch Texas Receives Water from United Methodist in North Texas Conference*
VSource10	*Sand Branch Protestor*
VSource11	*Two Examples of No Water*
NEWS	
NSource1	Sandbranch says "no" to involuntary move plan: Residents face forcible removal.
NSource2	Black Texas town withers because water is a luxury, not a right, for some Americans.
NSource3	Is Sandbranch about to get running water?
NSource4	"Leave us alone!" Sand Branch fights Dallas County's buyout plan.
NSource5	In Dallas County, a tiny community with no running water needs help
NSource6	Sand Branch gets short-term water fix
NSource7	Sandbranch doesn't need Dallas County to fund water lines, lawyer says, but obstacles remain
NSource8	Sandbranch is yet another poor, black community without clean water
NSource9	Strategic Vision and Plan for Improvement to the Sandbranch community
NSource10	The lost community of Sand Branch
NSource11	"America's dirty little secret:" The Texas town that has been without running water for decades
NSource12	Sandbranch Texas: A small community denied water for over 30 years fights back

The text was observed for minor and obvious transcription errors, heavily weighted towards non-replacement of possible errors. A selected sample of replacements were "we shall not be moon" to "we shall not be moved," "San Branch" or "Sam Branch" to "sand Branch," and "Sand Branches to Sand Branch is." There were statements that were obvious transcription errors, the meaning was not immediately discernible, and the audio did not provide an immediate clarification. For example, the statement "what God is doing Tipperary" had no simple replacements within context. However, during the text-based analysis, the term was understood to be "what God is doing temporarily." The overall result was minimal, as none of the replacement words was particularly interesting within the final context of the analysis. Words like "is" were removed as grammatical constructs. "Sand" and "Branch" were removed as being overwhelmingly common and obscuring any clear analysis; since they were the search terms to find the initial articles, they were presumptively included in every article. "Tipperary" was a single instance, and any replacement would only have had a single instance of replacement.

Step One: Systematic Analysis. For the text-based analysis, basic functions are typically run on the text (de Jonge, 2013). This allows the data to be considered for interesting words, rather than for grammar words or pronouns or similar. It also prevents punctuation, capitalization, or other words from interfering with similar words. The data was read into *R 3.5.1* using standard R methods (R core Team, 2018). All characters were transformed into lower case letters   All punctuation was removed. All numbers were removed. The data was transformed by tokenizing it over single word sequences – that is, the single large block of text for each artifact was separated out into individual words; each word was placed on a new line of the table; the other attributes such as title, author, etc., were duplicated; word order was maintained (Tidyverse, 2017). The data was filtered by removing Standard English stop words (words that are considered uninteresting to any analysis, and

provide no contextual clues to considering the content of the analysis, such as 'as', 'I', 'the', etc.). This list of uninteresting words was taken from the *tm* package (Feinerer, 2008) as well as the words "sand," "branch", "dallas," "county", and "sandbranch". These latter words were added to prevent them from overwhelming the final analysis and preventing finer details from being identified.

Step Two: Interpretive content analysis using Bing Sentiment Lexicon. Next, two new data tables were created by duplicating the existing data tables and adding a new column. On the first table, the single word attribute was matched with words taken from the Bing Sentiment Lexicon (Liu, 2012), a long-standing lexicon that matches words with a qualitative 'positive' or 'negative' value. On the second data table, the single word attribute was matched with words taken from the NRC Emotion Lexicon (Mohammed, 2010), a modern lexicon that matches words with a qualitative 'positive', 'negative', or primary emotion word from Plutchik's Wheel of Emotion (Plutchik, 1980). 'Positive' and 'negative' words were removed from the second table in favor of focusing on the nuanced emotions.

The data was visualized into a bar chart by number of occurrences of each interesting word using standard R methods to identify the most common terms, a simple word cloud over all text sources and a comparative word cloud between articles and transcripts to present a broad, simplified overview of the context of the discussion (Fellows, 2018) and bar charts representing the positive and negative word usage and the emotion word usage using standard R methods.

Step Three: Interpretive content analysis using open coding. A primary benefit of qualitative analysis is that this methodology allows researchers to identify meanings from individual and group experiences subsequently capturing the essence of their social world (Hseih & Shanon, 2005; Saldana, 2013). The researchers employed thematic decomposition analysis (Clarke, 2005) to examine perceptions regarding the lived experiences of residents and the environmental injustice issue stemming from the lack of access to clean water. Researchers reanalyzed the data through open coding using the predetermined themes based on the eight emotions derived from Plutchik's Wheel of Emotion (Plutchik, 1980). By utilizing a "contextualist' method (Braun & Clarke, 2006), the researchers analyzed not only the reality of the experiences of Sand Branch residents but the broader context of their experiences related to the concepts of environmental injustice and environmental racism. Initially, the first and second author read each transcript and used deductive analysis to identify how many passages reflected each of the following emotions: trust, joy, anger, anticipation, fear, sadness, disgust, and surprise. After the primary themes were attached to transcripts, each interview transcript was then reanalyzed to identify potential subthemes. In order to ensure coding reliability during the coding process, both researchers read each interview transcript together. The third author evaluated any passage that was not agreed upon and consensus was met.

Limitations
Formal quantitative content analysis has good reliability because it minimizes researcher bias and is less open to interpretation. However simply counting the content of media text provides little information about the context or the broader meaning. This limitation was reduced by also conducting a qualitative textual analysis. The qualitative analysis, while allowing the researcher to understand the context more fully, is limiting in that it relies on the researchers interpretation of the terms. The selected texts and videos many not have been representative of all members the Sand Branch community. Although the qualitative analysis provides rich texture not captured in a purely quantitative analysis, it cannot be applied to a larger audience. Lastly, the researchers assumed the residents were truthful in their expressions and testimony but they may have not been; however, their statements were consistent over a 30-year period.
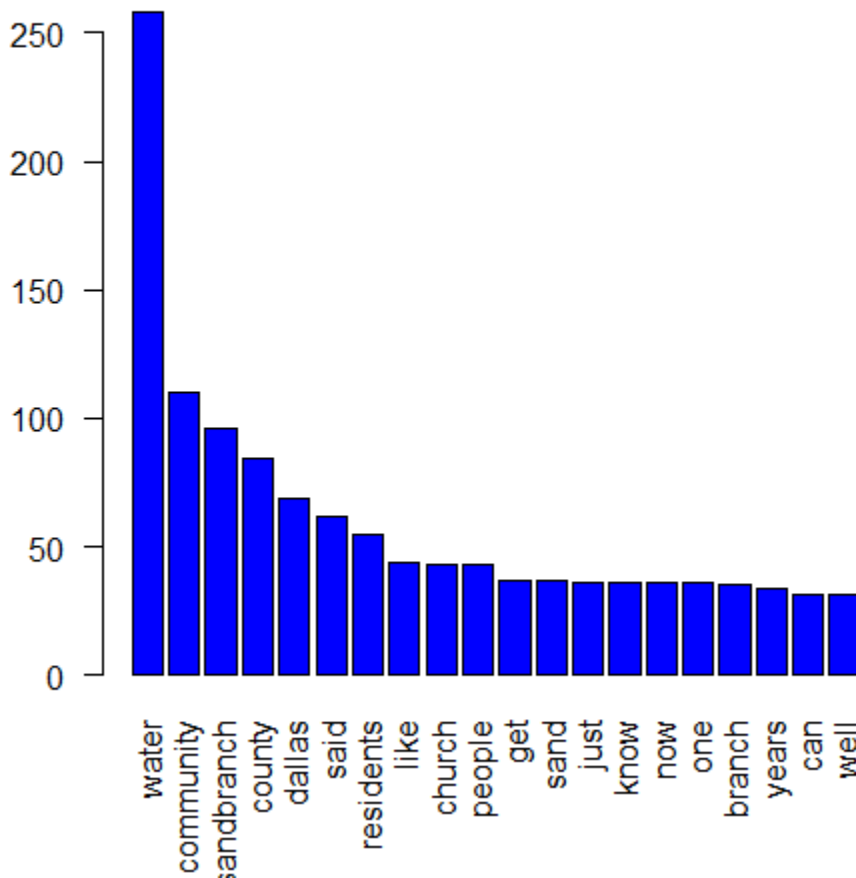
Results

Figure 1 - Count of Words

Figure 1 demonstrates the expected results that suggest a normal vocabulary on a given topic. Of note is that the distribution roughly follows Zipf's Law (Zipf, 1932). This helps support the validity of the analysis: even though the sample size is relatively small, it is large enough for a generalized pattern for text to emerge.

The discussion around Sand Branch often references a larger number of municipal functions, such as running water services, sewage services, and trash pickup services. However, the terms in the transcripts and articles are often substituted with just "water" to represent the entire range of missing services. An interpretation may be that although the issues include the municipal services of sewage and trash pickup, the immediate and daily impact is most strongly demonstrated in the lack of water. "Water" is also a more direct rallying cry than listing the independent ideas. Another interpretation is that the dialogue surrounding the Sand Branch community resonates more strongly and is more upsetting for both third and first party observers by centralizing the word choices on a singular and central human need that is understandable at a visceral level.

After "water," the discussion is focused on the location within the United States as particularly egregious. It then minimizes the reader's stake in the blame by anonymizing the words for the participants ("community" and "residents"). The most surprising of the interesting words in the top 20 is "church," which refers to Mt. Zion Baptist Church, which is frequently used in any discussion of the Sand Branch community as a central location of community and bottled water distribution.

Figure 2 - Word Cloud of Common Words

Figure 2 reiterates the same pattern as the bar chart, where visually larger words are more common in the source material. The terms "water" and "community" overwhelm the rest of the smaller terms. These are dominant terms in the discussion. This is important, as the Sand Branch community is not part of an incorporated city, but retains a sense of identity. It is important that the identity helps to recenter the discussion on a common frame of reference. It is a potential shortcoming of the single word analysis that the most common word is "water," when the discussion centers on lack of water. It is likely that further analyses with a larger word tokenization might identify further trends; however, they would likely be minor variations on the central theme.
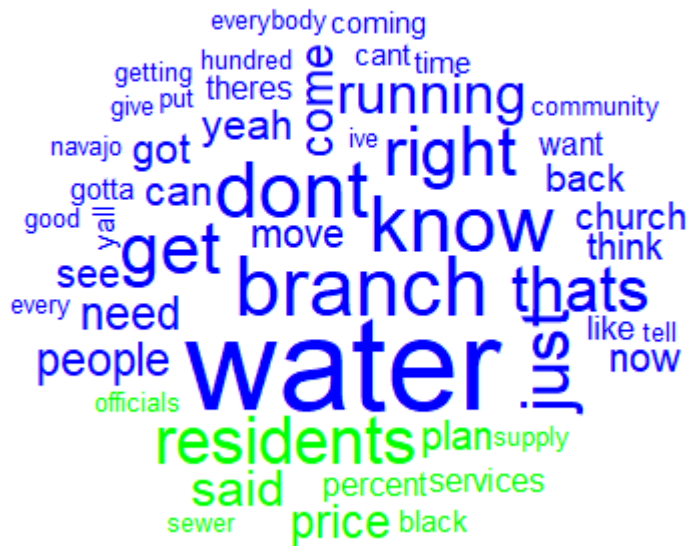
Figure 3 - Comparison of Words in Articles v. Transcripts

Figure 3 is a comparison between the most common words used in the video transcripts and the most common words used in the articles. If an assumption is made relating to the nature of the authors, an interesting pattern emerges. Since the video transcripts are primarily centered on the individual residents with first-hand video records and the articles are typically written and published in news journals, there is a distinctive difference in the terms that are used most often. As a result, the outside observers from the printed articles, represented in green, focused on "residents," "plan," "price," and the fact that it is a predominantly "black" community. The direct interviews with residents used the word "water" more often than the articles, but other phrases start to emerge visually. "Don't know" and "people need" are the immediate examples.

A possible interpretation of this comparison visualization suggests that the first person experience emphasizes immediate needs and imagery of what the solution would look like. Of note are that the words "community," "church," and "now" appear with the residents, suggesting that there is a more direct visualization of the issues. The outside observers from the articles use words that emphasize the current situation as a problem in need of a future solution. One word of interest is the word "price" used relatively often by the article authors. Price is the name of the Dallas County Commissioner.
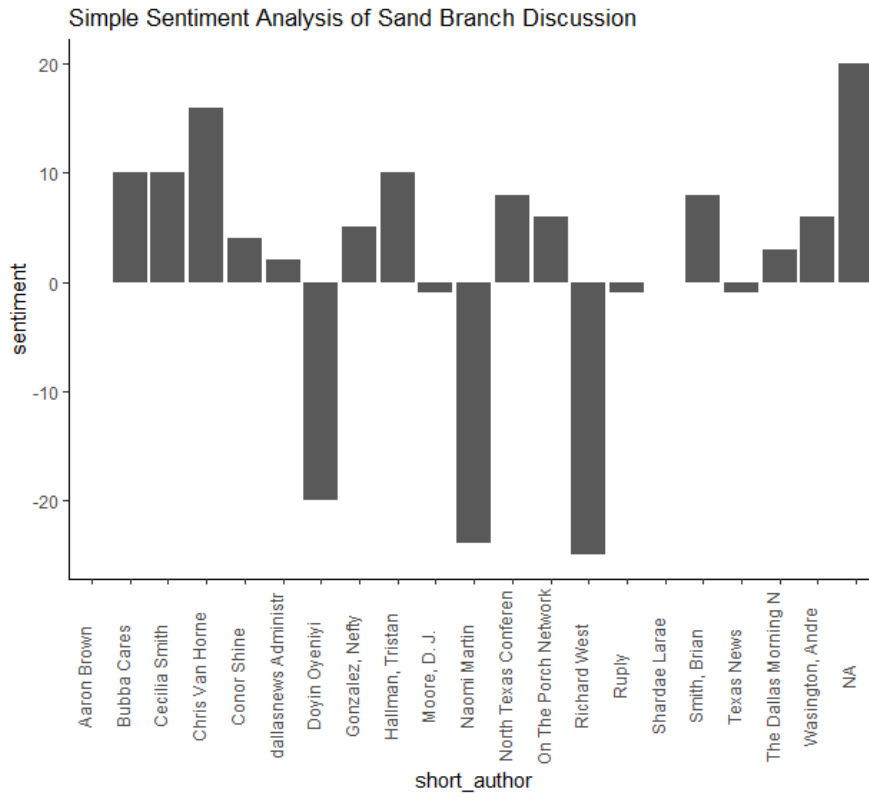
Figure 4 – Sentiment Analysis of Sand Branch Discussion
Note: short_author refers to the author's name from Table 1

Figure 4 shows the results of a sentiment analysis of individual words by comparing to the Bing Sentiment Lexicon. It was expected that the words used to describe a negative situation, like a community being without water, would be predominantly negative. However, this analysis shows a surprisingly positive tone to the discussion. Residents had a tendency to use solution-oriented action terms (positive) and discuss the strength of their community (positive). The outside observers had a tendency to withhold negative comments regarding the situation of others. To a certain extent, this suggests that the discussion is not about water denial as the primary theme and the location of Sand Branch as the secondary theme. Instead, it suggests that the entire discussion is framed in terms of the primary theme stemming from the sense of community of the residents of Sand Branch. Everything else is tangential to that central theme. Of note, the large negative indicators are all writers of printed articles (outside observers).
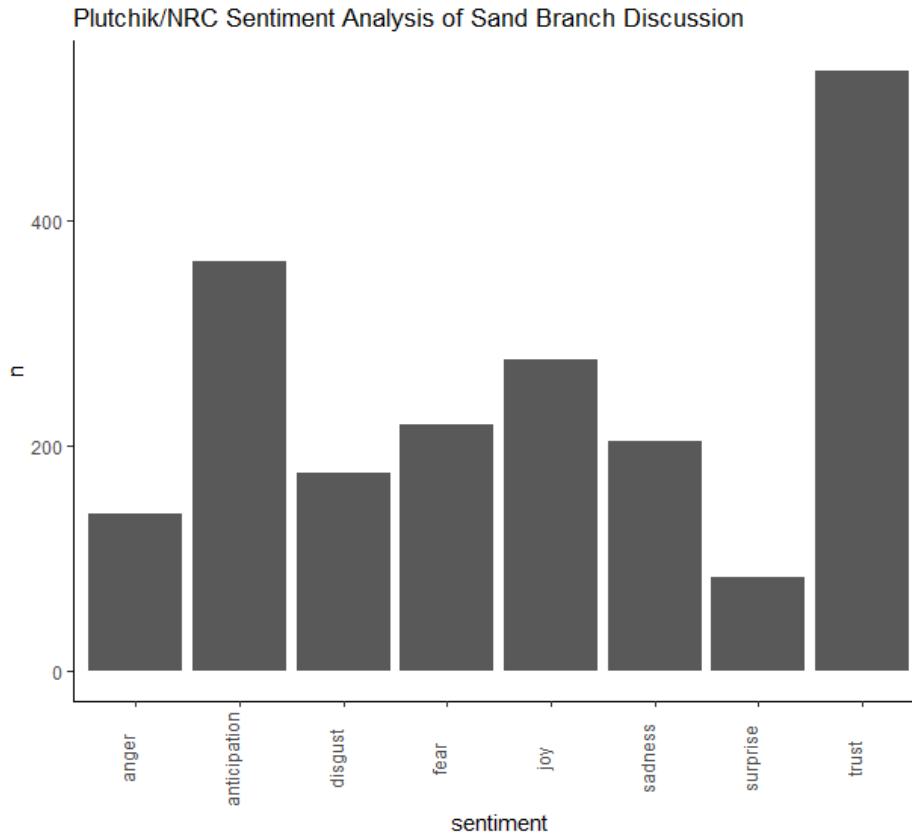
Figure 5 – Plutchik/NRC Sentiment Analysis of Sand Branch Discussion

Finally, Figure 5 shows a consideration of the emotion words on the part of the audience. Because the NRC emotion lexicon uses a very large sample size of end users to make associations between the words and the emotions, the metric is not about the intent of the author; it is about the perception of the reader. This method has some limitations; for example, different words evoke different meanings from different individuals. However, the intention is to derive a broad-spectrum understanding of what the broadest possible audience perceives in aggregate.

As a result, in the NRC lexicon, words like "government," "judge," and "court" are placed in the "trust" category, which also is compatible for a low-income community involved in a highly litigious issue. The "anticipation" words that come in second place stem from phrases like "soon," "solution," and "next," and seem to come largely from the documentation of the attempted solutions to the water supply problem. A general interpretation of Figure 5 might be "Residents and observers anticipate a solution from trusted government bodies."

Moving through the analyses, there is a progression from documenting the problem in terms of a singular high-impact issue toward the separation between author frame of reference and the general positivity of the discussion. There is an implied trust that exists on the part of the participants of the discussion around Sand Branch to believe that government bodies will develop a valid solution to the current issue.

Qualitative Results

Table. 2

Distribution of Syntax Thematic Expressions by Source

(n=23) Videos	Trust	Antic.	Joy	Fear	Sadness	Disgust	Anger	surprise
VSource1	3	3	1	1	1	0	0	0
VSource2	0	2	1	0	3	1	2	0
VSource3	0	1	2	0	2	2	2	0
VSource4	0	0	2	0	0	0	0	0
VSource5	0	3	0	7	2	2	6	0
VSource6	1	2	0	0	3	2	0	0
VSource7	0	1	2	0	1	0	0	0
VSource8	0	0	0	1	0	0	1	0
VSource9	2	2	2	0	2	0	0	0
VSource10	2	2	0	0	2	0	2	3
VSource11	2	1	0	2	3	4	0	2
V- Total	10	17	10	11	19	11	13	5
NEWS								
NSource1	2	3	0	3	1	1	5	I
NSource2	4	1	2	1	3	3	2	0
NSource3	3	3	3	0	2	0	0	1
NSource4	5	1	0	1	1	0	0	0
NSource5	0	0	0	0	0	2	1	0
NSource6	3	3	1	0	0	0	1	1
NSource7	8	2	0	4	1	2	2	1
NSource8	0	0	0	3	2	1	1	2
NSource9	3	4	1	0	0	0	0	0
NSource10	6	3	1	6	7	8	1	0
NSource11	3	1	1	2	6	1	3	2
NSource12	6	0	4	3	1	7	4	3
N-Total	43	21	13	23	23	23	16	11
Total	63	38	23	33	42	34	29	16

Trust

Trust was predominately narrated through the lived experiences of Sand Branch residents in terms of legitimacy describing confidence that obligations and commitments would be fulfilled by other entities (i.e., government agencies). Examples include government promises and plans to resolve the problem, non-profit groups and churches delivering water to the community and potential grant funding. Yet, in spite of the 33-year unsuccessful battle to bring safe drinking water to Sand Branch, the residents continued to show a high degree of trust in government, nonprofit agencies, and other entities to alleviate the problem. In 2016, the residents gathered in a planning session, as they had done many times before, to discuss the two major hurdles, money and restrictions over building in areas prone to flooding; and with government officials map out the latest strategy to bring water to Sand Branch. In that meeting were representatives from local, state, and federal government.

". . .at least one of those hurdles - cash - seemed to become somewhat surmountable Wednesday, as officials and leaders for the poor Dallas County community mapped a plan. At least 10 federal, state, and local agencies grappled with how to improve conditions in the long-neglected neighborhood" (NSource 7).

Another sub-theme underlying trust was a belief in a better tomorrow, which was tied to strong religious beliefs and faith in divine intervention.

 "What God is doing temporarily is just to get us ready for a long-term solution so we're extremely excited about how He's taking this small thing and getting us ready for a big thing. I remember before Moses crossed the sea, they had to see it and once they saw they had to believe. . . the next step was to cross it. We're just saying we see the water tower but the next step is to drink the water and that's what's coming" (VSource 9).

The third sub-theme was that of self-efficacy reflecting beliefs in one's own or beliefs in the community's ability to overcome any hardships and the ability to resolve the problem.

" . . by community, we mean an area populated by people who have constant relationships, quality friendships, and secure families. They trust each other. They cooperate with each other. They rely on each other... to honor this sense of community. . the grassroots effort known as *Sandbranch . . . everybody's community!* [was formed] to craft a plan for bringing water, sanitary sewer, and social services to the Sandbranch Community" (NSource 9).

Anticipation

Anticipation was described as a sense of assurance and excitement that the problem is about to be resolved soon. The following quotes were reported in March 2016 and December 2016 respectively.

"Could running tap water finally be on the way to the tiny Dallas County community of Sandbranch? We've seen promising signs this week that it just might . . .There's more good news. Because Sandbranch is now part of a development and water supply corporation, it can receive grant money for engineers and water infrastructure and to buy water from the city of Dallas . . Figuring out how to help Sandbranch has been a struggle. .But that was then and this is now" (NSource 3).

"We will have water next year . . . I am confident of that. Sandbranch will get water... Sandbranch will receive all the things they should have had all these years" (NSource 12).

Joy

Joy resonated in the prospect of being cared for in terms of receiving aid and help from the entities, in particular church groups, and nonprofits. Although short-term solutions, donations of items such as water bottles and water dispensers fostered reactions of happiness and gratitude from the Sand Branch residents.

"It may seem small but this is a huge thing for us ...We're really excited about this fix. We know it's not long-term but we're excited" (NSource 6).

Fear

Two prominent subthemes were derived from the data analysis under the theme "fear." The subthemes were *lack of future socio-economic stability and lack of access to healthy drinking water.* Fear was expressed in terms of uncertainty and the lack of future socio-economic stability resulting from Dallas County policy changes. For instance, in 2005 Dallas County conducted a buyout of homes in Sand Branch to allow the residents to relocate to other communities. The average Sand Branch resident, with a $720 monthly income who most likely owned his or her home or only paid a mortgage of $160 per month now faced locating and moving to a new residence with a mere $350 net payoff (Savali, 2016). In 2016, Dallas County informed residents they were planning to conduct a second mandatory buyout (News Release, 2016).

"Dallas County staff designed a plan to remove all residents from Sandbranch and demolish their homes...Residents who refuse the voluntary buyout would be removed involuntarily . . . some of these residents are well into their senior years and have lived their entire lives in Sandbranch. A move would all but kill them" (NSource 1).

Fear was also vocalized as concern for access to healthy drinking water as clean water is not only linked to improve health but of more importance, water is an essential requirement to sustain life. In 1985, the Dallas County Commissioner expressed concerns regarding the health of Sand Branch residents.

"Their water is dirty, unhealthy and smells bad . . .They have no power downtown. Kids drown in those gravel pits. The wells and septic tanks are inadequate" (NSource 10).

The Dallas County Commissioner's concerns were confirmed through water analyses conducted by the Dallas County Health Department; a safety concern, which still exists today.

Sadness

This theme encompasses two sub-themes. The first refers to the decay, destruction, and deterioration of the community and its ecological environment, which the authors labeled degradation remorse.

"It is an isolated place, an island of sorrowful homes, dusty streets, hog pens, trash piles, and very poor people surrounded by gravel pits half-filled with water, top-soil hills, abandoned quarries, drag lines and thundering gravel trucks... all the debris of civilization was washed up like the last line of seaweed on a beach . . ." (NSource 10).

The next sub-theme is based on the premise of defeatism and the revelation that many hopes and beliefs would not be achieved. For example, the planning director at Dallas County who enthusiastically sought grant money for Sand Branch in 1985 and assured the County Commissioner that Sand Branch was prime for receiving financial help to fix their water problems expressed a very different sentiment in 2017.

"We looked at it and thought something could be done but it's a Rubik's cube and we haven't been able to line up all the colors on one side" (NSource 11).

Disgust/Anger

This theme overwhelmingly reflected individual's discontentment regarding perceptions of mistreatment and injustice in terms of disparities in allocation and access to governmental resources.

". . . our government is more than willing to send money all over the world and we can't even take care of our own at home" (VSource 11).

"Dallas County has plenty of money, but they don't want to spend money in this community . . . All we're talking about [is] $2 million to bring water to Sandbranch. We pay taxes, but we have to fight the government to get a water bill." (NSource 12)

The anger theme is consistent with traditional description and reflects a negative emotional reaction to a stimulus, in this case, hostility toward government entities for the lack of clean drinking water. A resident of Sand Branch who had gathered with other residents and supporters to protest the lack of water in Sand Branch was interviewed in March 2016 and nearly 2 years later a white journalist traveled to Sand Branch to interview residents about the lack of infrastructure in their community.

"We have been neglected, you know pretty much pushed to the side; like we didn't matter but we do matter. We're here. We're going to get water" (VSource 10).

"'We don't have water here and you know why?' asked ... a spry 83-year-old black man. . . 'The pigment of my skin. If I were white like you I bet they'd have water down here'" (NSource 11).

Surprise

The theme of surprise is expressed as astonishment and disbelief of these events are occurring in the United States during in the 21st century.

"You don't really expect to see these living conditions next to one of America's wealthiest cities" (NSource 11).

" . . . in 2016 that's unthinkable because we're not a third-world country. We're in like one of the wealthiest cities in the United States" (VSource 10).
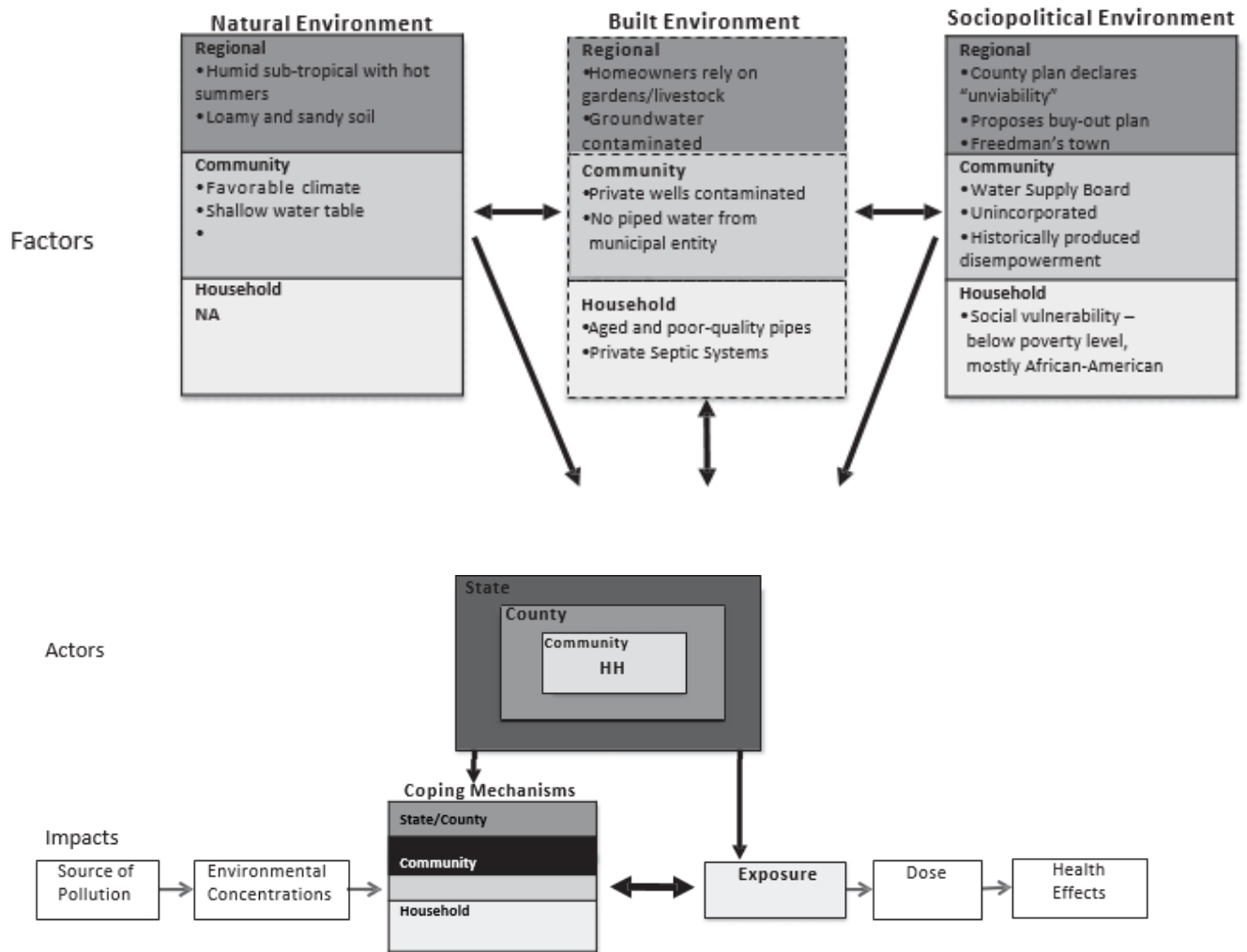
Discussion
The selected methodology allowed the researchers to analyze key words, phrases, and sentiments expressed by the residents and observers of the Sand Branch community through news articles and videos produced from 1985 – 2018. The intent was to understand better the lived experiences of the stakeholders involved in Sand Branch's struggle to obtain safe drinking water. Sand Branch exhibits characteristics of a community that has been harmed due to environmental injustices, environmental racism, and procedural injustice.

As evidenced in Bullard's (1983) study of solid waste sites located in poor and minority communities in Houston, Texas, gravel pits and the Dallas Southside Wastewater Treatment Plant were located within yards of the unincorporated poor and minority community of Sand Branch, Texas. When the residents attempted to take legal action to prevent the placement of gravel pits next to their community, the case was dismissed after a few years (West, 1985). When the private wells became contaminated, the Dallas County pointed to factors other than the Wastewater Treatment Plant (Milman, 2017). In 1985, when the community asked the city of Dallas to support

them in obtaining Texas Community Development Program funds to build a water line extension from an existing city of Dallas water main to Sand Branch and then bill the residents for city water, the Dallas City Council would not consider waiving city policy that does not allow sale of city water to unincorporated communities without sewage systems; thus shutting down the possibility of applying for the $3.4M grant (West, 1985)

According to Figure 6, The Drinking Waters Disparities Framework developed by Balaz and Ray (2014), Sand Branch was built in a natural environment that supplied fresh drinking water for many years, however "built" and "sociopolitical" environmental factors combined with sources of pollution exposed Sand Branch residents to an unhealthy situation due to lack of safe drinking water. The choice to place the wastewater treatment plant next to the Sand Branch community, the lack of representation found in an unincorporated town, the lack of opportunities for the poor, mostly African-American residents to participate in decision-making, and the inadequate resources to build the necessary infrastructure all point to environmental injustice, environmental racism, and procedural injustice.

Note: HH = household; NA = not applicable; Multilevel environmental factors act through multilevel actors to have an impact on exposure and coping capabilities. Race and class characteristics are embedded in many of the factors and actors throughout.

Figure 6. The Drinking Water Disparities Framework applied to the specific community of Sand Branch, Texas (Balaz and Ray, 2014)

The first objective of this study was to determine which key terms from the news articles and videos linked to environmental injustice in Sand Branch, Texas. By performing a word frequency analysis, the researchers analyzed key words, phrases, and sentiments expressed by the residents and observers of the Sand Branch community through news articles and videos produced from 1985 – 2018.

The frequency of the words used and the juxtaposition of the words and phrases used by residents in videos to words and phrases used by journalists in news and magazine articles, uncovered some interesting dichotomies. The videos revealed phrases such as "don't know," "want

back," with "water," expectedly used most frequently. These words indicate the residents were focused on water as the major issue and demonstrated their need but inability to obtain it or know of any long-term solution. The news articles, written from the authors' points of view focused on the residents, a plan, what was said, and Price. (The open coding method utilized by the researchers revealed that Price was the name of the County Commissioner, as opposed to price as it relates to cost.)

The videos were more likely to project resident and observer perceptions of current conditions whereas the news articles, stories, and one editorial focused primarily on the research and observations of the writers, with pointed questions about the lack of services. The sentiments expressed most often in the videos were sadness, anger, and anticipation, compared to the news articles frequent mentions of trust, with fear, sadness, and disgust all scoring the same.

Interestingly, the findings from the NRC Lexicon Sentiment analysis expressed in terms of most often to least often were trust, anticipation, joy, fear, sadness, disgust, anger, and lastly surprise; compared to the researchers list of most often observed to least observed as trust, sadness, anticipation, disgust, fear, anger, joy and surprise. Like the lexicon, when thematic decomposition analysis was applied, the researchers found that 'trust' exceeded the other sentiments by a greater margin; and 'surprise' was the least sentiment expressed by both analyses. However, the more noteworthy difference was in the sentiment of joy (scored high on NRC lexicon; and low in the thematic analysis). The remaining sentiments, although not exact matches, supported the validity of the exercise.

The key terms revealed in the content analysis were found to link with environmental injustice and environmental racism. Neal et al (2014) argued the unequal distribution of power affected those with little economic capacity negatively and could result in the perpetuation of burdens on disempowered groups, leading to environmental injustices. Sallie Mae Smith, a 70 year old African-American woman who moved to Sand Branch in the 1940s and was interviewed in 1985, summed up the idea of environmental injustice when she said, "We are too weak, too poor, and too black for folks to care . . . I believe nothing of what I hear and only half what I see, you hear me?" (DMN, 1985). In addition, the sentiments of sadness, anger, and disgust revealed a community of people who felt they had been treated unfairly and betrayed by the government that was required to treat them equitably.

The second objective of the study was to discern how the lived experiences of the Sand Branch residents were described by the Bing Sentiment Lexicon. The lexicon provided a thematic framework to the researchers to analyze the news articles and videos, which uncovered sub-themes as to the type of incidents that led to the various sentiments. For instance, trust was discussed in several ways: trust in government, trust in God, and trust in self. Due to the high degree of trust in one or more of those entities, trust scored highest on the lexicon of lived experiences. Like trust, anticipation also ranked surprisingly high. Given the parameters of environmental injustice, anger and disgust seem more fitting; however, upon further analyzation of the content, Sand Branch residents were aware the only solution to their problem is the collaboration of governmental organizations and these were key points in their interviews and videos. They have worked toward that goal. In addition, several of the residents featured have maintained a "can-do" spirit and discussed the "fix" that would be coming soon.

Disgust and anger were the two sentiments most closely aligned. Moreover, just as trust was often associated with government, disgust and anger were more than likely aimed at government. Residents of Sand Branch spoke honestly about the reasons they believe the gravel pits and the wastewater treatment plant had been built and why no surrounding city surrounding nor federal

agency was willing to send water to their community. They stated clearly that it was because they were poor and black.

Sadness also ranked high in the news articles, primarily because the news articles were more likely to describe the terrible conditions at Sand Branch, a sub-theme the researchers labeled as "degradation remorse." A director at the Dallas County health department stated in an interview that Sand Branch was the poorest and neediest unincorporated community he had seen (West, 1985). The other sub-theme of sadness was defeatism. Because the average age of Sand Branch residents is 68, and most of those individuals have been in this struggle for 30 years or more, several stated they do not see a fix within their lifetime or ever. Twenty-one years after Sallie Mae Smith make her statement to the reporter she died at the age of 91, and no city or federal government proved her statement wrong.

Another sentiment expressed among the residents and observers was fear. Researchers found two sub-themes; one is fear of the socio-economic impact. This was clearly expressed when the county was attempting to mandate a second buyout program with the remaining 100 residents. The first buyout of resident homes was viewed as a dismal affair that left people financially unstable. Sand Branch residents, although poor, own their homes or pay a very low mortgage. The idea they could lose the little they have created a large amount of fearful conversation. The other sub-theme of fear expressed was the fear of disease from exposure to the unsafe drinking water. In one case, a Dallas County Health official counseled a resident who was over-using Purex in his drinking water on the appropriate amount of Purex he could safely place in the water to purify as the use of Purex could also be dangerous. Lastly, the sentiment of surprise was rarely found among the residents or observers of Sandbranch. In the few cases of expression, it was mostly due to an observer learning that extreme conditions of poverty existed so close to wealth and in modern times.

The third objective of this study was to determine how individuals perceive environmental injustice in Sand Branch, Texas. The phrases "environmental injustice" or "environmental racism" were not used by the Sand Branch community members; however, the key concepts of marginalized communities exposed to environmental harms found in environmental injustice and environmental racism literature could be found in the quotes of the residents recorded in the articles and videos assessed in this study.

Pulido (2000, 2015) argues that white privilege plays a role in environmental decisions, a premise echoed by Ivory Hall, an 83-year-old black man in Sand Branch, who said, "We don't have water here, and you know why? . . . The pigment of my skin. If I were white like you I bet they'd have water down here" (Millman, 2017).

The residents also expressed feelings of powerless in the placement of the Dallas Southside Wastewater Treatment Plant that they blame for their lack of drinking water.

"Yep, what's coming up from the pump right there, it's not suitable to drink . . . it's contaminated. We had well water for about a hundred years or so and then the county put in the water treatment plant right next to the community and slowly, but surely, the water treatment plant started destroying our water tablet [*sic*]. Now the county will tell you it's because of the animals but we've always had animals, over 100 years we had animals, and we still had good drinking water and once the plant runoff poured into our water [table] and destroyed it so now we don't have good water because the [table] is contaminated . . . we'd just like to see running water, we would like to have a quality of life that make sense to any American, any Dallas

County citizen, any citizen in any state . . . and we wouldn't be asking for water if
the water plant hadn't messed up the [water table]" (Dallas Morning News, 2016).

Government plays the most important role in the water supply infrastructure of the U.S. (VanDerslice, 2011), yet the government is seen as nonresponsive, and policies are viewed as obstructive by many residents of Sand Branch. "Dallas County has plenty of money but they don't want to spend money in this community . . . All we're talking about [is] $2 million to bring water to Sandbranch We pay taxes, but have to fight the government to get a water bill" (Savali, 2016). In addition, even the various branches of government point accusatory fingers at one another. Dallas County Commissioner John Wiley Price, who has represented the Sand Branch community since 1985, outlined the difficulties faced by the county. "Over 25 years ago, I tried to bring water when there were 400 people living there ... I had heard about Sandbranch when I was a kid. And I drove over there and saw it. I saw the conditions were deplorable. I began to work on it. Community Development block-grant money; whatever I could try, I did. I went to the Texas Water Development Board and got minimal funding. I was going down the road; I was trying to bring water. And then FEMA stepped in and said, 'No. You're in violation, you can't do it.' That's why we've been on hold ever since" (Savali, 2016).

Residents played no role in the decision-making that placed the waste water treatment plant next to Sand Branch and the courts threw out residents' case against the building of gravel pits (West, 1995). Sand Branch's two public servant supporters, John Wiley Price, Dallas County Commissioner since 1985, and Rick Loessberg, former County Grants Administrator were unable to bring water to Sand Branch. (Oyeniyi, 2016) Lastly, Pastor Eugene Keahey, the most vocal activist for Sand Branch since 2010, tragically died February 28, 2019 (Smith, 2019). Procedural justice requires citizen participation (George & Reed, 2017) and as the number of Sand Branch community members decline, it becomes less likely they will have opportunities to provide meaningful input or have the capacity to obtain needed resources to build the infrastructure needed.

Conclusion
Sand Branch community began its fight for safe drinking water when there were more than 400 residents. Now nearly 40 years later, less than 100 residents remain in the community, still without access to clean drinking water. Although the residents expressed anger and sadness over the quality of life and the response of government toward their problems, trust and anticipation continue to thrive in this small unincorporated community. Currently Sand Branch is typical of many marginalized communities facing environmental injustice environmental racism, and procedural injustice. If the city, county, state, and federal governments continue the response patterns it has exhibited for the past 33 years, Sand Branch may simply be another freedman's town that no longer exists.

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