COMMUNITY RESILIENCE AND RESPONSE FOLLOWING PFAS CONTAMINATION
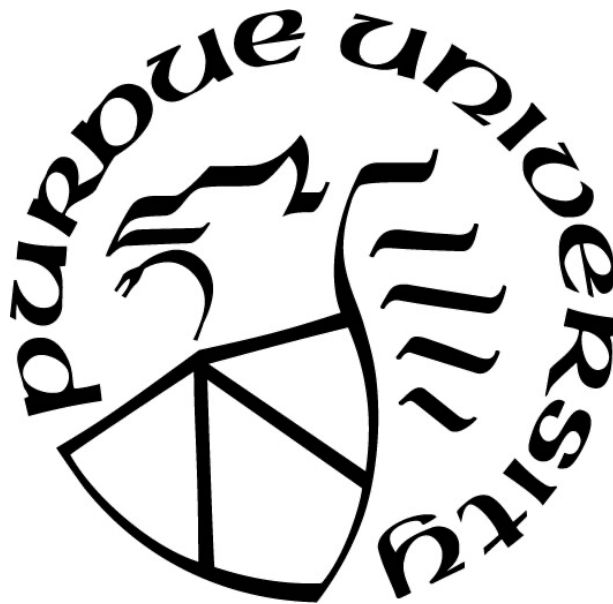
by

Henry Seeger

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THE PURDUE UNIVERSITY GRADUATE SCHOOL
STATEMENT OF COMMITTEE APPROVAL

Dr. Stacey Connaughton, Co-Chair

Brian Lamb School of Communication

Dr. Seungyoon Lee, Co-Chair

Brian Lamb School of Communication

Dr. Linda Prokopy

Department of Forestry and Natural Resources

Dr. Patrice Buzzanell

Department of Communication, University of South Florida

Approved by:

Dr. Marifran Mattson

To Beth, Matt, and Maggie, who have supported, encouraged, and sacrificed with me along every step of my journey.

And to my fiancée, Jamila. Any successes I have had would be meaningless without you to share them with.

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ABSTRACT

Water is a critical resource for life, and communities are dependent upon reliable access to clean water to maintain stable quality of life. Issues of water contamination threaten this stability, creating uncertainty, threatening public health, and necessitating community response. One emerging water contamination issue involves a family of industrial chemicals called Per- and Polyfluoroalkyl Substances (PFAS). This study uses an integrated multi-theory approach to examine the processes of Resilience and Collective Action within a community experiencing issues of PFAS contamination. Results indicate that the community was generally successful in enacting resilience, however some challenges were encountered in the form of high levels of uncertainty, inaccessibility of technical information, challenges foregrounding productive action, and challenges maximizing transformative potential. Results also indicated the community was general successful with collective action in the immediate aftermath of the issue. The community struggled to maintain collective action over a long period and to transition to high level advocacy. Results demonstrated that existing theoretical frames are limited in their ability to predict effective resilience and collective action in events of long-term water contamination. These limitations are described in detail and the potential for expansion of these theories is discussed. Suggestions to improve future responses to issues of PFAS contamination, as well as suggestions for intervention into the community of focus are offered.

CHAPTER 1 - INTENTIONS

Water is a critical resource for life and is also used in manufacturing, recreation and agriculture. According to the International Conference on Water and the Environment (ICWE) "Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment" (n.p.). There is an increasing need to understand the processes that go into understanding, adapting, and responding to issues related to water access. Communication is central to how water systems are managed and understood, however, communication research is only just beginning to understand the unique communicative dimensions surrounding water issues. In 2016, The International Association of Hydrological Sciences (IAHS) articulated an urgent need for the social sciences to examine the social processes surrounding water and water systems. There is a clear imperative for communication research to pay close attention to emerging water-related crises to build a foundation of knowledge around these issues.

One emergent water issue is in the form of Per- and Poly-Fluroalkyl Substances (PFAS) contamination. These chemicals have seen wide use in a number of industrial contexts and are present in many water systems around the world. PFAS was first recognized as an environmental pollutant following research by the United States Environmental Protection Agency in 2003 and did not receive significant scientific attention until a 2017 article by Burton and Blum in *Environmental Health*, called for coordinated health research in PFAS-contaminated communities in the United States. Subsequent academic research and a growing concern with water contamination issues drove increased testing of water systems in the state of Michigan, revealing a number of seriously impacted communities across the state. The highest concentration of contamination in the state was found in the water systems of the northern Kalamazoo River watershed, supporting the city of Parchment and the nearby Cooper Township.

This dissertation utilizes a multi-theory approach to examine community processes of resilience and collective action following the discovery of PFAS contamination in the community of Parchment and Cooper Township. Creative and non-traditional reporting methods are utilized to support an engaged, relationally attentive examination of these processes. In this chapter I establish my general goals and intentions with this dissertation project. I then lay out the paradigmatic foundations of this research, introducing the Scholarship of Engagement and Crystallization as guiding philosophies of research for this project. I conclude with an overview of the structure of this document.

Research Goals

This project aims to present an integrated analysis of the ways the city of Parchment and Cooper Township used communication processes to inform and construct responses to a serious event involving contamination of drinking water. I focus on understanding the development of constructive activities and reactions in response to an uncertain disruption.

The interplay between communication, resilience, and collective action together provides a cohesive and holistic picture of a community's response to water crises and issues. The attention to communication processes follows the general consensus that response to contamination events requires effective community engagement and risk communication (EPA, 2019). The goals of this projects are reflected in four research questions presented in the following sections.

Research Context

The city of Parchment, Michigan and the geographically proximate Cooper Township are small municipalities situated along the banks of the Kalamazoo River in southwest Michigan, near the Indiana border. Parchment is a homogeneous midwestern community with 75% white residents

with a mean household income of $47,000 a year. Cooper Township has a population of 96% white residents, with a mean household income of $67,000 a year. Parchment is home to the former site of the Kalamazoo Vegetable and Parchment Company, and the city was known as the 'Paper City' due to the large number of paper mills located there throughout the latter half of the 20th century. Other industries in the area included tanneries and shoe companies. The last of the paper mills closed in the year 2000, coinciding with the larger recession of manufacturing and industry in the state of Michigan. The people of the area believed that the era of the mills had ended, but the greatest impact of these manufacturing sites upon the community was yet to be discovered.

In July of 2018, a routine test conducted by the Michigan Department of Environmental Quality showed a level of 1,587 parts per trillion of Per- and Poly-Fluroalkyl Substances (PFAS) in the Parchment municipal water system. This was more than 70 times the Environmental Protection Agency's lifetime health advisory for PFAS. Additional testing throughout the area discovered widespread contamination of local wells throughout Cooper Township. The source of the contamination was clear; PFAS chemicals had been widely used by the paper mills and tanneries in the area throughout their operation, and the majority of those mills failed to properly dispose of the chemicals. As a result, the local groundwater system was broadly and irreparably contaminated with a number of highly toxic chemicals (Matheny, 2019; Reade, et al, 2019).

The discovery of high levels of PFAS contamination were made public to the community of Parchment and Cooper Township on July 26, 2018, and plans were established for the municipal water system to connect to the nearby Kalamazoo, MI water system. In the primarily rural community of Cooper Township however many individuals and families were dependent on local wells which are separate from the municipal water system and typically not regularly monitored nor tested. These individuals were also at risk of exposure but had to wait for state government

officials to test all the wells in the area before they would know if their water was safe to use. For all members of the community who had lived their lives dependent on this water system however, any transition at this point was too little too late. The community was poisoned, and the only unknowns were the extent of the damage to the residents who had been drinking contaminated water, and what the state government would do in response. A fuller narrative account of the discovery and response to the contamination is provided in Chapter three.

As this dissertation will show, the people of Parchment and Cooper Township are currently living through a multifaceted crisis event – a crisis of public health, finance, ecology, identity, and public confidence. As a primarily working-class community strongly affected by the decline of the manufacturing industry, the community is to a large extent dependent upon external actors for financial support during this crisis. Their plight has also been overshadowed by the larger PFAS contamination crisis involving hundreds of industrial, military, water and disposal sites throughout the nation, including seventy-two sites in Michigan. As a small city, Parchment's crisis has not received the level of media attention that normally attracts resources to communities affected by public health crises of this nature. The emergent issues throughout Cooper Township have received even less attention. In addition, the community appears to have struggled to come together and enact collective community resilience towards this crisis event. As one community member articulated in a 2019 Facebook post,

> To put it bluntly, it seems nearly impossible to mobilize community members to be involved with the 'water issue.' Why is that? Are community members reluctant to participate because they feel the issue is resolved? Is it to maintain privacy? Is it simply lack of interest? Time constraints? Concern over property values? Do some members feel that they've been drinking the water so long that it doesn't matter what happens at this point? Is it lack of opportunity?

The tests of water systems indicated that contamination in Parchment and Cooper Township is relatively severe in comparison to other cases, but this it is not an isolated case. Mounting evidence is demonstrating widespread PFAS contamination across the United States, with especially heavy concentrations of contamination in the states of Michigan, Massachusetts, New York, Alabama, Georgia, and southern California (EWG, January 6, 2021). Other locations continue to be identified as additional testing occurs. Some communities have very high levels of PFAS contamination in ground water and in municipal water systems. Because PFAS has only recently become an issue of public concern that is impacting and affecting individuals' day-to-day lives, there is comparatively little research examining the social aspects of this issue compared to the research examining the technical and human health aspects. The recent surge in public awareness of PFAS contamination has led to an increasing need to explore how the contamination has impacted communities and how they have responded to the risks. Only a few studies have been conducted in communities across the United States gathering generalizable data and assessing impact (Daly et al. 2018; Graber et al. 2019; Boone et al 2019).

The ongoing issues of contamination in Parchment and Cooper Township are compounded by the onset of the COVID-19 pandemic in 2020. COVID-19 is a compounding crisis creating an additional threat to human health, high levels of uncertainty, and disrupting established routines. PFAS exposure may increase the severity of COVID-19 infections, and the negative impacts of both the disease and the contaminate may compound together to produce more severe emergent health outcomes (Burton & Blum, 2017). The confluence of these crises has likely interacted and compounded the threat to the community, and further compromised their ability to make sense of what they are experiencing and respond in constructive and resilient ways. Most crisis research has examined discrete events rather than the confluence of multiple events and research examining

cascading crises from a systems perspective is an emergent area of crisis thought (Wallerstein 2011; Kuipers & Welsh, 2017). Cascading crises are compounding events associated with the interdependence of critical systems, accumulation of vulnerability, and increasingly detrimental consequences (Pescaroli et al., 2018). The compounding impact of COVID-19 on the PFAS crisis creates additional challenges for research in terms of data collection and creates a unique opportunity to expand understandings of the ways crises may interact. Existing research has demonstrated the importance of examining cascading crises towards improving social capacity to mitigate and cope with real-life crises, which are rarely self-contained (Pescaroli et al. 2018). Within the confluence of cascading crises, communicators in the form of translators, interpreters, and educators are critical factors for crisis management and the creation of long-term resilience (Alexander & Pescaroli, 2019).

Research Design

This project is undertaken with a view towards developing a shared insight *with* the affected community of how the processes of resilience and collective action were enacted following this crisis, both to lay the groundwork for next steps within the community as well as to serve as a model for other communities navigating similar challenges.

Specifically, this dissertation seeks to answer four research questions.

RQ1: How has the community of Parchment and Cooper Township enacted resilience towards the issues of PFAS contamination?

RQ2: How has the community of Parchment and Cooper Township organized towards collective action to address the issues made salient by the discovery of PFAS contamination?

RQ3: How might the community of Parchment and Cooper Township improve their capacities for resilience?

RQ4: How might the community of Parchment and Cooper Township improve their capacities for collective action?

A multi-theory approach was employed to explore these questions. Two traditional research phases explore the processes of resilience and collective action in the context of Parchment and Cooper Township from the individual, community, and state level. The first phase (presented in Chapter four) evaluates these questions in the context of publicly organized meetings seeking to address issues of PFAS contamination. The second phase (presented in Chapter five) draws on insights from relationally attentive conversations with community members to further evaluate these questions. Holistic evaluation of these questions draws on insights from both phases as well as context gleaned through a narrative history of the community and auto-ethnographic reflection by the researcher.

The paradigms of the Scholarship of Engagement and Crystallization were used to inform overall research design and research representation. The article format laid out in the Brian Lamb School of Communication Thesis and Dissertation template was chosen for this dissertation instead of the traditional monograph structure. This structure was chosen so as to take advantage of the multi-method approach used in this study as well as to emphasize the separate-but-related nature of the various research phases. This structure has the advantage of creating a connecting, logical thread across the different research phases without overly complicating the presentation of any particular approach (Schmeltz, 2012).

The research questions proposed for this project are explored in five additional chapters. Chapter two of this dissertation expands on the supporting literature for this project through a board review of scholarship addressing communication around water issues, PFAS, resilience, and collective action. Chapter three of this dissertation embraces the paradigm of Crystallization and describes the history of both the City of Parchment and the community's PFAS crisis in journalistic

narrative form. This narrative approach provides a context and structural grounding for the subsequent chapters and presents a narrative logic of the events associated with the crisis and the community's response. Chapter four of this dissertation provides additional context for this research through a thematic event analysis of recordings of town meetings within the target community. These meetings were used by the community itself and by political agents as a primary method for community engagement and communication. Town meetings are communication events and performances commonly used in addressing environmental contamination. Chapter five describes key concepts, procedures, and results of a qualitative interview assessment of members of the target community. Key informants were recruited from the community to participate in a series of unstructured interviews. These interviews were transcribed and reviewed for themes of communication, resilience, and collective action. The sixth chapter presents an auto-ethnographic reflection on the challenges inherent in engaged communication research during the COVID-19 pandemic crisis, and describes the limitations and obstacles encountered in this research. Finally, Chapter seven addresses the research questions and reflect on key insights and general observations that can be applied more broadly throughout the scholarship of resilience and collective action. This chapter also reviews directions for further inquiry and for engagement. The overall structure of this document is summarized in Table 1.

Table 1: A summary of the form, theory, and purpose underlying each chapter in this dissertation.

Title	Form	Guiding Theory or Framework	Purpose
Chapter 1 Intentions	Prelude	Engaged scholarship/ Crystallization	Establish structure and goals
Chapter 2 Literature	Literature review	Traditional research report	Review key concepts related to communication during water crises, PFAS, resilience, and collective action
Chapter 3 Parchment	Narrative summary	Crystallization, narrative theory	Summarize the history of the target community and provide a clear timeline of the crisis event.
Chapter 4 Meetings	Thematic analysis	Communities Advancing Resilience Toolkit, Trinity of Voice	Evaluate research questions through an examination of public meetings which were held to address issues of PFAS contamination
Chapter 5 Conversations	Thematic analysis	Communication Theory of Resilience, Social Capital Assessment Tool	Evaluate research questions through rich conversations with community members who directly experienced issues of PFAS contamination and were involved with the response.
Chapter 6 Reflections	Auto-ethnography	Crystallization, Auto-ethnography	Provide context for this project, explore limitations, and make explicit the positionality of the researcher.
Chapter 7 Implications	Discussion	Engaged scholarship/ Crystallization	Summarize and contextualize key insights from Chapters 4, 5, and 6, answer guiding research questions, and establish a plan for future research and community intervention

Research Paradigms

This research is guided by the research paradigms of the Scholarship of Engagement and Crystallization and undergirded by deliberate meta-theoretical choices. Meta-theory describes an

underlying set of perspectives, propositions, and assumptions that direct theory and shape fields of inquiry (Wagner & Berger, 1985; Overton, & Müller, 2012). A paradigm can be understood as an established set of interconnected meta-theoretical assumptions which provide a foundation for individual research and inform the meta-theory of individual research projects (Guba & Lincoln, 1994). The reflexive act of interrogating and acknowledging meta-theory throughout a research project functions to focus researcher intentions and helps to develop a consistent theoretical foundation underlying research (McPhee, 2000; Seeger in press). This process draws meta-theory from the realm of the sub-conscious and positions the research to make deliberate and intentional choices in the foundation of their research. The process of reflection and construction is begun here and extended throughout the document.

Scholarship of Engagement

The Scholarship of Engagement is a broad interdisciplinary paradigm of inquiry that works to connect the rich intellectual and economic resources of the research community to relevant social, civil, and ethical problems. Engaged communication research prioritizes five key principles (Simpson & Seibold, 2008). First, engaged research should make meaningful contributions to both scholarship and practice, and practice must be grounded in theory and research. Second, the pursuit of knowledge should be first and foremost motivated by practical questions and issues, rather than the resolution of merely 'academic' questions of no real practical merit. Third, research and scholarship should be developed and executed in tandem with practitioners and community partners, and the researcher should be de-centralized from the processes of scholarship. Fourth, engaged scholarship must be guided by firm ethical considerations and commitments. Finally, scholars doing engaged work must employ reflexive communication practices to build strong and lasting relationships between universities and participant communities. Engaged scholarship has

been a particularly important tool for making communication research relevant to organizational and community-based practitioners, and often requires the careful and critical exercise of communicative skills (Barge & Shockley-Zalabak, 2008; Connaughton et al, 2017).

For those of us committed to these principles, the issues of PFAS in southwest Michigan presents a clear moral imperative for understanding and engaged research. Communication scholarship is uniquely positioned to understand the processes underlying the community's struggles to respond to this crisis, and to provide resources to help improve this response. Community resilience, organized response, and collective action are communicatively constituted, and these processes can be best understood through the lens of communication theory. Risk communication, as described earlier, is an additional area of communication research and practice relevant to this case. This involves the process of negotiating information about the nature, magnitude, significance, and control of risk and it is particularly relevant to public health crises such as the one in Parchment (Covello, 1992; Heath, 2005). Risk communication is used widely to address issues of health and safety including water contamination (National Research Council, 1989, Santos, 1990, McComas, 2006). Finally, communicative approaches to engaged scholarship, particularly the Relationally Attentive Approach to conducting engaged communication scholarship (Connaughton et al, 2017), is ideally suited to navigating relationally complex and personally sensitive issues such as the issues of PFAS contamination in Parchment and Cooper Township. By critically explicating communicative choices and their potential impacts throughout the research process, this approach works to build lasting collaborative relationships between researchers and affected communities to actualize needed changes and impacts from research. Authenticate representation of participant voices also necessitates critical attention to form and is strengthened through ethnographic and auto-ethnographic work (Charmaz, 2001).

Crystallization

The qualitative paradigm of Crystallization prescribes epistemic and methodological structures for research that embraces social constructionist and critical perspectives, and as such synergizes well with the Relationally Attentive Approach to engaged scholarship (Ellingson, 2008). Deep, thickly described interpretations of meanings are drawn from lived experiences, represented in a multitude of ways, and including a significant degree of reflexivity by the researcher (Richardson 2000). When performing research from a Crystallization approach, "researchers immerse themselves as completely as possible in the experience of the participants; as understandings crystallize, they share them with participants" (Bradley, 1993, p. 445). This attempt at total immersion is a deliberate deconstruction of the positivist roots of academic inquiry, directly challenging conventions that distance and remove researcher from subject. By its nature, Crystallization does not follow a precise research path or design but interweaves numerous qualitative and creative approaches in order "to obtain a more complete picture of a complex and diffuse phenomenon" (Tobin & Begley, 2004, p. 394).

Crystallization invites researchers to make critical decisions about the form and style of their research representation, and one of the only true rules of the paradigm is the inclusion of non-traditional, creative analytic practices (Richardson, L. & St. Pierre, 2005; Ellingson, 2008). The use of the forms functions as a deliberate and conscious denial of objectivity, inviting the researcher to begin to root out the ideology of positivism that has engrained itself in academic work and thought. The inherent subjectivity of these forms places the researcher into direct contact with the subject, inviting emotional nuance and holistic understandings not possible through traditional academic writing. Creative analytic practices also function to establish a researcher's aesthetic and epistemic commitments, aiding both reader and researcher in coming to a fuller understanding of the paradigmatic underpinnings of the research (Faulkner, 2007).

Meta-theoretical Assumptions

This research operated from a blended epistemology which embraced conventional deductive procedures for scientific research, while also drawing on interpretive and humanistic ways of knowing. Traditional nomothetic processes of inquiry were used in the primary phases of this project to examine the guiding research questions. Specifically thematic analysis, a rigorous and methodical qualitative research method, was used in the evaluation of data gathered throughout phases 1 and 2. Thematic analysis is a highly effective method for the examination and synthesis of the perspectives of different research participants, and functions by summarizing key features of a data set, highlighting similarity and difference, and generating emergent and unexpected insights (Braun & Clarke, 2006; King, 2004). Through this process of inquiry the researcher becomes the instrument of analysis, but the researcher is not the sole subjective author of the conclusions drawn (Starks & Trinidad, 2007). The process of making judgments about code, themes, and context is methodical, deductive, and scientific – it is oriented around the generation of generalizable conclusions.

Idiographic methods were used throughout this document to build contextual understanding and enhance the discussion and evaluation of these questions. A narrative review of the history of the community explored contingent and unique cultural elements that shape and inform the story of the issue of PFAS contamination. Within this review, conventional communication theories were blended with historical and journalistic accounts and synthesized together in a non-analytic exploration of the community. In addition, an auto-ethnography was used to draw out the personal subjective experience of the researcher, telling the story of the research in a general exploration of the paradigmatic challenges encountered herein.

The paradigm of Crystallization was used to guide the integration of these disparate ways-of-knowing into a consistent epistemological foundation for this research. The idiographic

approaches described above enabled the successful implementation and evaluation of research phases 1 and 2. The narrative history provided increased immersion in the culture and context of the community of focus to better enable theme generation during thematic analysis. The auto-ethnography worked to explicate and reveal positionality of the researcher, which could serve to influence theme generation and weaken the analytical process. Both approaches provided necessary contextual insight to interpret the results directly for the community of focus, and to identify how to bridge the capacities of the researcher and the needs of the community within the Scholarship of Engagement.

A nominalist, constructivist ontology underlay this research, asserting that reality is socially constructed and positioning the researcher as primary author in the reconstruction of experience and meaning through the lens of the research itself (Charmaz, 1996). This ontology is reflected through the choice of thematic analysis as a primary method of analysis. This method invited the researcher to assume both the role of the instrument and the role of the author, elevating subjective perception of reality into generalizations through systematized, established scientific procedure. The validity of the method stems from the alignment of researcher insights with the theories and insights of the academic community; when thematic analysis interweaves findings with theory it creates merit for the entirety of the analytic process (Aronson, 1994). The social reality constructed through the literature elevates the subjective to the scientific.

A nominalist, constructivist ontology was reflected in the idiographic elements of this project as well, The narrative review of the history of the community explored consensus belief rather than attempting to establish fact of truth. The goal of the review was to understand the socially constructed reality of the community of focus. The auto-ethnography supported this goal

by explicating the researcher's positionality to place the reality of the researcher in conversation with the reality of the community of focus.

This ontological positioning drew critical attention to the methodological and aesthetic choices assumed by the researcher, and directly informed the axiology of this project. Within this project the value of research was understood through its capacity to directly reduce harm to the community of focus, and the role of research in reducing and otherizing subjects was challenged. The paradigm of Scholarship of Engagement guided this research in aligning with this axiological goal. Through the established ways-of-doing prescribed in this paradigm the researcher worked to break down barriers between themself and participants and establish direct outreach to the community. This axiology was used in the thematic analysis to elevate participant voices and synthesize disagreement and difference without silencing or otherizing (King, 2004). Auto-ethnography created further opportunity for critical reflection on this process, highlighting weaknesses in the procedures and allowing the researcher to intentionally construct their relation towards the community of focus.

This research axiology was also guided by key aesthetic assumptions. Close attention is paid to form through this document, and traditional reports are juxtaposed with creative and nontraditional research forms to draw attention to limiting conventions of form in communication research. Form is seen as a primary way that research contributes to the constitution of social reality. Researcher choices related to form reinforce or challenge norms and standards for knowledge and understanding. Academic writing is traditionally unemotional and inaccessible, and create discomfort in lay audiences (Clayton, 2015). In service to the goal of breaking down barriers between academia and participant communities articulated by the Scholarship of

Engagement, forms were chosen that defy convention and create discomfort for traditional academic readers.

Conclusion

Significant water contamination events will likely occur more frequently impacting the health, stability and well-being of individuals and communities. Among these are those events involving the forever family of PFAS and PFOA chemicals. As an emerging contaminate, PFAS has created very high levels of uncertainty for those communities seeking to respond. These and similar events will require a deeper understanding of effective response. Communication approaches and theories can provide insights regarding responses, including community resilience and collective action. Resilience can provide for a multi-disciplinary and engaged perspective to the large and growing technical, social, economic, ecological and public health problem of contaminated water.

CHAPTER 2 - LITERATURE

This chapter provides a review of relevant literature in the area of communication around water crises, technical science and grey literature addressing Per- and poly-fluoroalkyl substances, and social scientific literature examining the processes of resilience and collective action. This review provides support for the research goals and questions presented in Chapter one as well as theoretical foundations for the analyses described in Chapters four and five of this dissertation.

Literature Review

Communication around Water Crises

Generally, water is taken for granted until it becomes problematized, usually as a crisis due to extreme scarcity, abundance in the form of a flood, or contamination. According to the US Centers for Disease Control and Prevention: "Water-related emergency preparedness and outbreak response has become one of the most significant and crucial issues in recent history" (CDC, 2017). Cases of water contamination occur frequently. Water-related crises creates high levels of uncertainty and further complicate the dissemination of timely and accurate information needed to inform stakeholders, to reduce uncertainty, and to help manage the crisis (Renn, 2009; Liu, Bartz & Duke, 2016).

Water contamination events, such as the widespread and enduring contamination of water systems with PFAS chemicals in the areas of Parchment and Cooper Township, are powerfully disruptive events that radically transform the lives of those affected. Water contamination presents unique and significant challenges to both individuals and communities. Contamination of this type requires response – not just a policy response, but responses on the level of both the individual and

the community. People affected by these issues must decide how they *feel* about the contamination, how they will make sense of the various risks associated with the contamination, and how they are going to choose to move on and live their lives within the new status quo of water contamination.

Cases of water contamination occur frequently. A 1993 incident, for example, involved Cryptosporidium contamination of the Milwaukee, Wisconsin water supply. Over 400,000 people became ill with diarrhea from this water-borne parasite. The contamination was linked to run-off from agricultural operations that contaminated the city's drinking water supply. In 2014, 7,500 gallons of crude 4-methylcyclohexanemethanol (MCHM), a chemical used in coal cleaning, contaminated West Virginia American Water's Drinking water intake, treatment, and distribution center. Residents of the nine affected counties were advised not to drink, cook with, bath, or wash with the water. A total of 300,000 people were affected by the spill, with 14 people hospitalized for observation after showing symptoms including nausea, vomiting, and rashes (Getchell & Sellnow, 2016). The 2014 Flint, Michigan water crisis involved the contamination of a municipal water supply with lead when lead service lines became corroded following a change in the water source. Poor management of the system resulted in highly corrosive water and low levels of disinfecting chemicals (Nowling & Seeger, 2020). Some 100,000 residents of Flint, Michigan, including many children, were exposed to high levels of lead, a dangerous neurotoxin in their drinking water. The water contamination was also accompanied by an outbreak of Legionnaires disease, a type of pneumonia, which was linked to a dozen deaths in Flint in 2014 and 2015.

Dozens of other water contamination events have occurred in the US including in Hanford, Washington, Wedron, Illinois, Love Canal, New York, Woburn, Massachusetts and large oil spills including the Exxon Valdez case in Valdez, Alaska and the Deep Water Horizon, in the Gulf of Mexico, among many others. Across the United States, there are 1344 so called "Superfund"

contamination sites on the National Priorities List. Many are associated with water contamination (Canter & Sabatini, 1994).

Communication is central to how water systems are managed, understood and framed. When authorities have reason to believe that drinking water is contaminated, they have a regulatory obligation to communicate warnings to those at risk so that they may take precautions to prevent exposure (Lindell, 2013). These responses usually follow traditional models of crisis management designed to identify and implement actions to limit, contain and offset the harm that occurs from extreme disruptions (Bundy, et al, 2017). This response usually includes some communication activities as a "critical component in crisis management" (Coombs, 2010, p. 17). The Centers for Disease Control and Prevention, the Environmental Protection Agency and the American Water Works Association have all developed specific resources dedicated to effective communication in water emergencies. These include communication tool kits, message templates, fact sheets, planning documents, and check lists (CDC, 2016). In 1988, the EPA also described seven rules for risk communication. These included involving the public as a partner, planning, listening to concerns, being open and honest, coordinating with credible sources, meeting the needs of the media, and speaking clearly with compassion (EPA, 1988). Methods for responding to water contamination depend on the specific agents involved, their concentration, the location of the contamination, and the individuals and communities that are impacted. All, however, require effective communication with the public. Because water is a necessary commodity for life and the access to potable water is a basic human need, response methods must clearly communicate messages of risk and safety while also quickly providing safe water through treatment or replacement.

Research examining communication about water has generally centered on immediate questions of water-related crisis and response, as well as questions of risk communication related to water resources (Santos, 1990; Minamyer & Clayton, 2007). Communication research has generally not examined broader patterns of social interactions around water resources, including how communities make sense of an enduring water crisis. Some research has described the communication between water industry managers, technologists and regulators as poor (Owen, et al, 1999). Little communication research has explored communication about water from an engaged perspective. Moreover, improving risk communication and community engagement around issues of PFAS contamination are among the key goals identified by the Environmental Protection Agency in their PFAS Action Plan (EPA 2, 2019). The plan suggests, "Risk communication and engagement are critical for EPA to effectively support communities across the United States that are addressing PFAS" (EPA 2, 2019, p. 16). Explicit communication goals include coordinated messages across federal agencies and providing materials that inform the public of concerns related to PFAS (EPA 2, 2019, p. 5). Risk communication is identified as a component of research area 4: "How does the EPA support stakeholders in using science to protect public health and the environment?" This research area includes following the principles of science communication to inform stakeholders.

Research examining communication during water contamination events has also been framed as a question of public advocacy and issue management. Various groups and agencies seek to influence public option and polices. As described above, communication about water is most often framed as risk communication (Santos, 1990, Mercer, 2017). Herve-Bazin (2014) however argues that water communication functions more broadly than is allowed through a risk communication frame. Instead, water communication should include all forms of communication

related to water resources, including the interaction between stakeholders, campaigns, messages, symbols, and broader perceptions of values related to water access. Communication research has identified that communication around water issues is longitudinal and multi-scalar.

Communication around water issues extends far beyond the temporal confines of a singular crisis event, and bridges community, regional, national, and international groups. Despite this insight from the research, communication research has failed to adequately explore water issues as longitudinal and multi-scalar, focusing instead on immediate questions of response and management.

This gap in the literature is significant, as issues related to scale are often a concern of research examining water and water issues. Hoogester and Verzijl (2015) argue that scalar politics underlie struggles for water access, and that spatial scale is critically important to understanding water advocacy networks. Ongoing conflicts over water in El Salvador, for example, involve grassroots communities, indigenous populations, as well as national and international governments and transnational corporations, and similar multi-scalar struggles have been observed across Latin America (Rosa, 2017). In the Midwestern United States, water crisis communication networks integrate local actors with state and national organizations (Seeger, 2019). The Flint, MI water crisis activated fundamental issues of social justice, environmental racism and water as a human right and focused attention on questions of access to safe drinking water (Miller & Wesley, 2016). Partnerships between community members and the research community helped bring this crisis to public attention (Krings, Kornberg, & Lane, 2019). Organizing for advocacy around the issue of access to clean water, to be effective, must be multi-scalar – it must take place across local, regional, and in some cases global boundaries (Subramaniam, 2018). Responding in this multi-scalar way may help communities develop resilience by building support networks and leveraging resources.

The interplay between communication, resilience, and collective action together provides a cohesive picture of a community's response to water crises and issues.

PFAS

Per- and poly-fluoroalkyl substances (PFAS) are a family of over 4,500 human-made chemicals including PFOA, PFOS, GenX, among many others. PFAS have been widely used in manufacturing contexts since the 1940s. These chemicals are used to treat fabric, leather, paper and packaging materials to improve their resistance to water, stains, and other substances. PFAS are also used in the production of food packaging and non-stick cook ware (US EPA 1, 2019). PFAS are included in Class B firefighting foam (knows as Aqueous Film Forming Foams or (AFFF) which are used on gasoline, oil, or other fuel fires, and have seen extensive use for these purposes at both commercial and military airports. PFAS are chemically very stable, and do not break down quickly or easy. PFAS are bio accumulative, meaning that when these chemicals enter into an organism's body they are nearly impossible to remove, and they build to higher and higher levels of concentration. These chemicals have similar properties in ecosystems, and it is very difficult to remove them from environments once they are introduced. They are often characterized as "forever chemicals" because "these chemicals can linger on geologic time scales" (Sneed, January 22, 2021).

PFAS are known to cause a number of harmful health effects to organisms that are exposed, including changes in the function of the liver, thyroid, pancreas and hormone levels (Blake & Fenton 2020). There is evidence that exposure to PFAS can lead to adverse health outcomes in humans such as reproductive and developmental, liver and kidney, and immunological effects. Studies also suggested exposure increases cholesterol levels, leads to low infant birth weights, affects the immune system, and is associated with cancer and disrupted thyroid function in

laboratory animals (US EPA 1, 2021; ASTDR, 2019). In addition, epidemiologic evidence suggests that PFAS and PFOA are likely human carcinogens associations with kidney and testicular cancer in cases of high exposure (Temkin, et al., 2020). PFAS chemicals are also immunotoxic and some studies suggest that they may affect lung functioning in ways that contribute to the severity of COVID-19 infections (Grandjean, et al. 2020). Much, however, remains unclear about the impact of these chemicals on human health.

Despite the clear negative health impacts, testing for PFAS chemicals in water systems is not the norm. A 2016 study found that PFAS chemicals were detected at or above the EPA's minimum reporting levels in public water supplies serving 16.5 million residents in 33 different states, as well as three American territories and one Indian Community (Hu, et al, 2016). In January of 2021, the EPA announced that it would increase regulation of PFOA and PFOS.

> EPA will now initiate the process to develop a national primary drinking water regulation for these two PFAS, which will include further analyses, scientific review, and opportunity for public comment. Additionally, EPA intends to fast track evaluation of additional PFAS for future drinking water regulatory determinations if necessary information and data become available (US EPA 1, January 19, 2021).

Mounting evidence is demonstrating widespread PFAS contamination across the United States, with heavy concentrations of contamination in the states of Michigan, Massachusetts, New York, Alabama, Georgia, and southern California. The state of Michigan was among the first states to instigate widespread systematic testing, after high levels of contamination were discovered at a former US Air Force base in the town of Oscoda, Michigan. Several sites of significant contamination have been identified across the state, as shown in Figure 1.
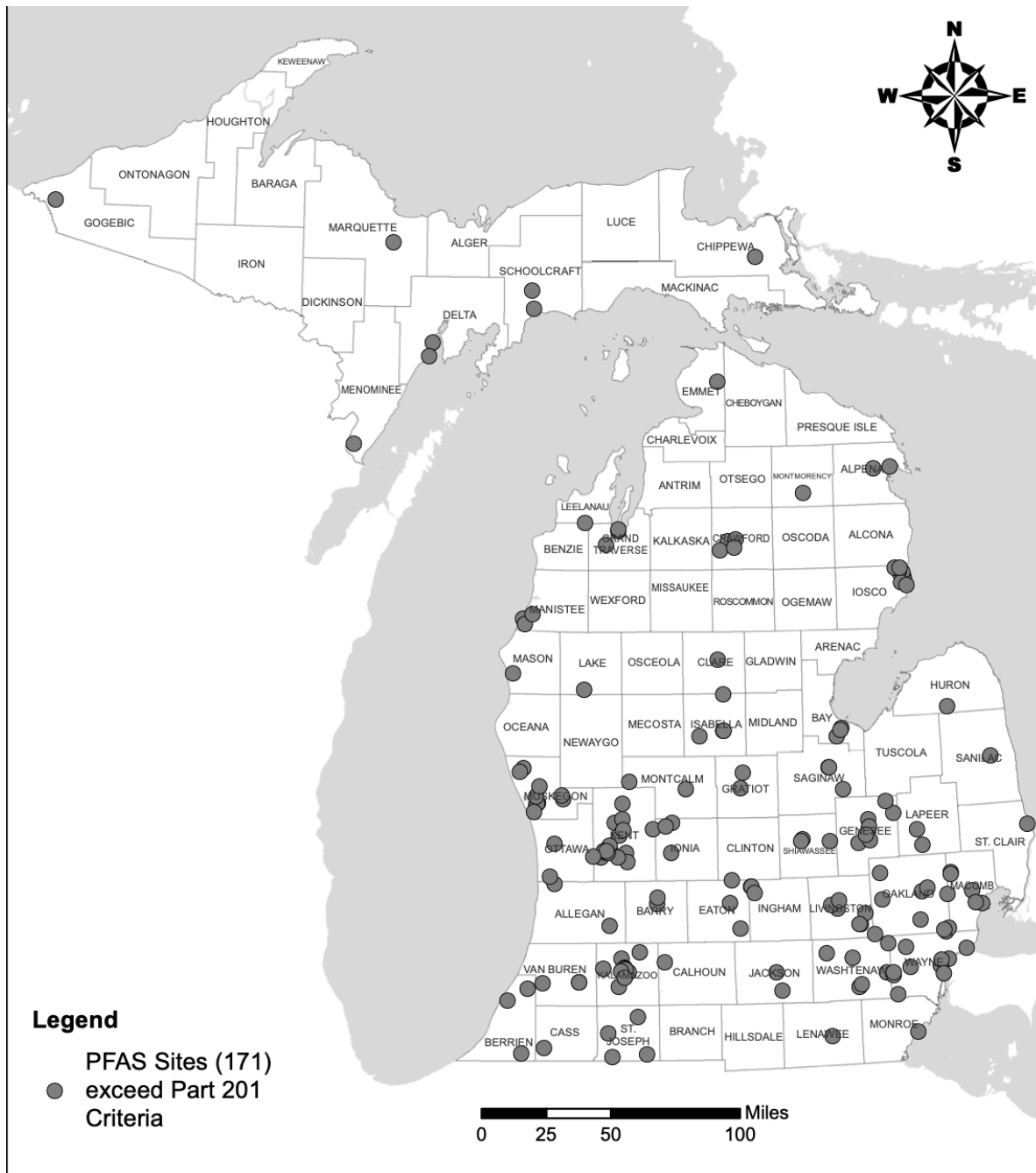
Figure 1. Map of PFAS contamination sites in the state of Michigan, June 21, 2021. (EGLE, 2021).

Other locations continue to be identified as additional testing continues across the country. Some communities have very high levels of PFAS contamination in ground water and in municipal water systems. Because PFAS has only recently become an issue of public concern that is

impacting and affecting individuals' day-to-day lives, there is comparatively little research examining the social aspects of this issue compared to the research examining the technical aspects of this issue. The recent surge in public awareness of PFAS contamination has led to an increased need to explore how the contamination has impacted communities and how they have responded to the risks (Burton & Blum, 2017).

While PFAS has only recently become a major focus of regulatory action, PFAS were first recognized as an environmental pollutant following research by the United States Environmental Protection Agency in 2003. Since 2003 there has been a large body of research within academic and governmental organizations which focused on these chemicals, however, this research has prioritized technical and scientific aspects of PFAS over the social and political issues surrounding these chemicals. Communication and community engagement questions about PFAS contamination remain unaddressed.

Academic Literature on PFAS

Academic investigations of PFAS have focused on questions of distribution, treatment of contaminated water, and overall impact on health. A chronological examination of traditional academic literature reveals a general bias towards research in the physical sciences examining rates of distribution, as well as health science investigation into rates of exposure. Medical studies on affected human populations have been extremely limited. Even fewer studies have specifically examined social and political aspects of PFAS contamination, and little work has examined PFAS in the context of risk management and response.

Prior to 2010, PFAS was a minor area of focus in academic literature, with the majority of research on this topic originating from physical sciences and resource management and focusing on contamination in Nordic countries. One of the earliest academic discussions of PFAS

contamination comes from a conference presentation by Berger in 2004, discussing the result of a screening on the distribution of PFAS across five Nordic countries financed through the Nordic Council of Ministers. The study found widespread distribution in the environment as well as presence in human blood plasma. Berger would go on to work with marine biologist Marianne Haukås to examine the bio-accumulation of PFAS in aquatic species in the region of the Barents Sea, publishing their results in the *Journal of Environmental Pollution* in 2007. A similar study in 2010 by Moller et al. examined sources of PFAS contamination along the River Rhine watershed. Scientific research continued in this form until relatively recent to this review, focusing most of its attention on recording and cataloguing distribution of contaminations and severity of impacts, primarily in the area of Nordic countries.

Despite the wide international use of PFAS chemicals in manufacturing contexts, there were fewer efforts to examine issues of contamination in other areas of the world. In 2005, a team of researcher tested for the presence of PFAS in the liver and eggs of species living in and around the Great Lakes in Michigan, finding high concentrations of PFOS (a chemical sub-family of PFAS) in predatory species (Kannan et al. 2005). Elevated concentrations of PFAS were found in dolphins living in the Charleston Harbor in the early 2000s, leading a team of researcher to examine rates of exposure in Gullah African American populations of coastal South Carolina (Houde et al., 2005). Longitudinal data collected from 2003-2013 showed a relative decrease in PFAS concentrations within the population and highlighted the broad need for research into the PFAS exposure and impacts on human populations (Gribble et al., 2015). A similar examination of blood from American Red Cross donors from 2000 until 2015 found declines in overall rates of exposure, possibly correlated to many US based manufacturers voluntarily phasing out products produced using PFOS in the early 2000s (Olson et al., 2017). A study funded and published by the American

Chemical Society in 2013 acknowledged the dispersion of PFAS in the United States but characterized the chemicals as "environmentally benign" (Schutzius et al. 2013).

PFAS first became an area of major concern for international scholarship around 2016, with a surge of scientific research examining issues of PFAS contamination in the United States and India. As with previous research targeting contamination in Nordic countries, the *Journal of Environmental Pollution* proved a significant outlet for research examining contamination in these areas. In 2016, an article describing the concentrations of PFAS in the area of the Ganges River was published, followed in 2017 by reports comparing contamination in the Ganges with contamination in the Periyar and Yamunda Rivers as well as the larger Arabian Sea basin (Binu et al., 2017).

Kurunthachalam Kannan published a review of literature in *Environmental Chemistry* in 2011 summarizing the body of knowledge that had been assembled by the scientific community since PFAS was first identified as an environmental pollutant in 2003. Kannan wrote that major advances had been made in the understandings of the environmental chemistry of PFAS, but a significant knowledge gap existed with regards to the risks and impacts of contamination. Kannan correctly identifies a number of important gaps in the physical science literature but fails to explicitly identify what would continue to be the most significant gaps in PFAS literature over the course of the next decade - the lack of adequate social scientific understandings of PFAS contamination, and the lack of adequate procedures for evaluation and response to contamination.

Kannan's insights were built upon by Burton and Blum's 2017 article in *Environmental Health*, which voiced an open call for coordinated health research in PFAS-contaminated communities in the United States. Burton and Blum identified that existing response structures were insufficient to adequately address community needs towards PFAS contamination, and that

there was a need for a broad, interdisciplinary effort to generate information and integrate insights concerning PFAS. Burton and Blum's call came quickly after a similar call from the International Association of Hydrological Sciences (IAHS), highlighting the need for social scientific approaches to water management issues to address emergent problems of access and contamination of water systems (Mount et al. 2016).

Driven by increasing public concern around PFAS contamination, an explosion of research examining PFAS contamination in the United States has occurred since 2017. This research has followed the patterns established by earlier research, with focus placed on distribution and exposure assessment. Recent studies have been conducted in communities across the United States assessing impact and gathering generalizable data (Daly et al. 2018; Gabber et al. 2019; Boone et al 2019).

The recent surge in research interest in PFAS has led to some new areas of investigation. Environmental engineers have examined new methods for treating PFAS contaminated water (Kucharzyk, et al, 2017; Ross et al, 2018). Other efforts have sought to identify sources of PFAS contamination in ground water (Lang, et al, 2017). Savitz (2019), in an article published in *Environmental Epidemiology*, reported on a summary of policy issues and noted that many unanswered questions remain for the research community should address. He identified five key issues: (1) The specific forms of PFAS to be regulated; (2) Estimation of thresholds for health effects and assessment of 70 ppt drinking water threshold; (3) Importance of various exposure pathways; (4) Clinical guidance to those with elevated PFAS; and (5) Methods to mitigate exposure through changes in environmental policy (Savitz, 2019).

The Journal of Exposure Science and Environmental Epidemiology published a special issue on PFAS contamination in March 2019 which sought to bring scientific understandings of

PFAS as a chemical contaminant into conversation with questions of risk and impact management. The introductory article by Elaine Hubal provided an accessible and thorough review of the policy decisions that precipitated PFAS contamination within the United States, described the current state of the PFAS crisis, and discussed potential regulatory action for the future. The special issue includes a number of studies which follow traditional assessment approaches to PFAS contamination, but also includes a number of studies which seek to integrate social scientific perspectives into the conversation around PFAS. The article by Cordner et al. (2019) discusses differences between accepted guidelines in assessing PFAS concentration and draws on rhetorical and social scientific ways of understanding.

Beginning in 2020, there was a significant surge in human medical testing related to PFAS exposure, providing additional support for a variety of hypothesized health impacts. Ding et al. (2020) demonstrated several PFAS chemicals function as endocrine-disrupters that specifically interfere with ovary function and represent a major risk to women's health. Steenland & Winquist (2021) conducted a non-random meta-analysis of epidemiologic studies associating PFAS with cancer risk and determined that evidence for a direct association with cancer and PFAS was sparse, but that there was significant evidence connecting long-term PFAS exposure with testicular and kidney cancer. A random effects meta-analysis by Bartell and Vieira (2021) found contradictory results, demonstrating a strong weight of evidence that PFAS exposure was most likely causal for kidney and testicular cancers.

The social sciences have thus far failed to adequately examine issues of PFAS contamination within affected communities. This represents the most significant gap in existing academic literature on PFAS contamination, especially in light of the multiple calls for integrated research into these issues.

Grey Literature on PFAS

Grey Literature is a term commonly employed to refer to research and informational materials produced by organizations outside of traditional academic institutions and publishing channels. While the term is sufficiently broad so as to encompass a broad variety of materials, it most commonly refers to technical reports, guides, and documents produced in governmental, civil, not-for-profit, and private organizations. An exhaustive review of grey literature on any subject is challenging, as often grey literature is not made available to the public. However, a broad array of literature concerning PFAS contamination in the United States and related issues is publicly available and accessible. For this review, only grey literature produced through the United States Government was considered, as literature produced for other organizations is significantly less accessible.

Governmental agencies were critical in the initial investigations into PFAS as a toxic environmental pollutant in the early 2000s. Particularly critical in early investigations into PFAS were a body of studies conducted between 2003-2004 as part of the National Health and Nutrition Examination Survey operated by the US Centers for Disease Control and Prevention (CDC), which estimated that over 98 percent of the U.S. population had detectable levels of PFASs in their blood (New Jersey Drinking Water Quality Institute, 2015). The United States Environmental Protection Agency (EPA) operates the PFOA Stewardship Program, which works with companies to reduce reliance on PFOA for manufacturing purposes. The PFOA Guideline Document (2010/2015) published through this program helps companies become more aware of their use of PFOA and alternatives in manufacturing.

Generally, the US government did not produce a significant body of reports or research literature around PFAS until after the discovery of serious contamination sites in 2018. The majority of work around this issue was done in academic spaces and distributed through academic

venues even internal to governmental institutions. The National Institute of Health maintains a database of notable PFAS research online for both internal and external reference. The database primarily includes assessment-based research from health and the physical sciences published between 2007 and 2013, with a handful of more recent studies included.

Both the CDC and the EPA have increased their publication of materials related to PFAS and PFAS contamination in recent years. Unlike previously published documents, these materials are primarily aimed at the public to increase awareness, answer common questions, and provide directions for managing local issues of contamination. Many of these documents provide simple information to lay audiences, and many of the materials are redundant to each other. The guiding document at the heart of this surge in publications is the EPA's PFAS Action Plan, a document debuted at the May 2018 National Leadership Summit which describes the EPA's strategic initiative towards PFAS issues (EPA 1, 2019). Specifically, the document identifies the following strategic goals:

- Initiating steps to evaluate the need for a maximum contaminant level (MCL) for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS)

- Beginning the necessary steps to propose designating PFOA and PFOS as "hazardous substances" through one of the available federal statutory mechanisms

- Developing groundwater cleanup recommendations for PFOA and PFOS at contaminated sites

- Developing toxicity values or oral reference doses (RfDs) for GenX chemicals and perfluorobutane sulfonic acid (PFBS).

- Developing new analytical methods and tools for understanding and managing PFAS risk

- Promulgating Significant New Use Rules (SNURs) that require EPA notification before chemicals are used in new ways that may create human health and ecological concerns

- Using enforcement actions to help manage PFAS risk, where appropriate.

The EPA created summary and longform versions of the Action Plan and made these documents widely available (EPA1, 2019; EPA2, 2019). Additional EPA documents mostly come in the form of press releases detailing the EPA's efforts to create and execute a cross-agency effort to address PFAS issues.

Documents recently produced by the CDC tend to take a more informative stance and seek to raise awareness of issues associated with PFAS contamination. A collection of Fact Sheets, including a summary of health effects, exposure risks, and even chemical structure have been produced and distributed through the CDC, often in partnership with the Agency for Toxic Substances and Disease Registry. These documents are primarily aimed at lay audiences, however, some of the documents are part of a *Continuing Education for Clinicians* program to help medical practitioners gain proficiency with PFAS-related health issues (ATSDR, 2019).

State governments have also produced a variety of materials about PFAS aimed at the public. The guidelines published through the Michigan Department of Environment, Great Lakes, and Energy (EGLE, Formally the Department of Environmental Quality) follow the general structure and form of the fact sheets produced by the CDC but are considerably more specific in focus (EGLE, 2020). Since 2018, EQLE has published fact sheets describing the procedures for residential sampling of wells, soils, fish tissue, surface water, and sediment, as well as guidelines for recognizing PFAS caused foam on bodies of water, guidelines for the consumption of fish and game in PFAS affected areas, guidelines for performing a flush of a residential water system, and many other highly informative fact sheets. Unlike the CDC fact sheets, these documents seem directly aimed at individuals working to gain literacy in PFAS and formulate a response to real contamination as it is experienced by individuals in their day-to-day lives.

The Michigan PFAS Action Response Team (MPART) is a dedicated group of individuals and agencies commissioned by the office of the Governor to address issues of PFAS contamination in the state. Beginning in 2018, MPART has published a body of documents under the collected title of *Taking Action, Protecting Michigan* that aim to provide information to the public as well as the media about the specific issues of PFAS in Michigan (MPART, 2019). These documents provide overviews of testing results of particular sites and provide historical timelines of the PFAS contamination of these sites. The documents also provide suggestions for good habits for safety in impacted areas and address frequently asked questions.

PFAS contamination is a complex of many issues, including technical, social, political, economic, and environmental issues. The existing research base is steeped in a strong foundation of technical and scientific knowledge, with a focus on chemistry, water treatment and public health. Current information about this family of contaminates is very limited in its overall scope. A great deal of uncertainty surrounds PFAS contamination. It is a significant emergent issue of contamination that will require concerted and integrated research from the physical and social sciences, as well as through academic and non-academic spaces, to adequately manage. Understanding both the technical and social dimensions of the PFAS contamination is necessary to build a foundation of understanding for this issue. The social issues needing investigation include communication processes related to resilience and collective action.

Resilience

Community resilience is a central focus of communication research seeking to understand water issues (Mitra, 2018). Community resilience describes attributes that allow communities to function efficiently and adapt successfully following the surprise and severe disruption created by a crisis (Norris, et al., 2008). Research into resilience following crises events such as those

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involving water has identified several factors that influence a community's resilience. These factors can include federal, state, and local policies, individual and community resources, as well as physical and social networks (Norris, et al., 2008). In addition, cultural narratives of water contamination can influence resilience following contamination events (Seeger & Sellnow, 2016). These narratives may influence the ways communities respond to water contamination.

Human-water systems are constituted through patterns of use. Communities are usually built in close proximity to sources of water and when possible large bodies of water, and these water systems provide needed resources for the people of the community. In many cases, communities are named for the water resources that support them. These water resources provide the community a source of drinking water, a space for communal organization, a place for recreation in the form of swimming, fishing, and boating, a cultural and community symbol and an identity. Communities are often defined in terms of the water, and the naming of the water discursively constructs the community (Cusack, 2010). Scholarly investigations into socio-ecological systems have generally made these points of interactions a central focus, and the mapping and recording of resource use and occupancy is a powerful tool to understand the relationships between communities and their ecologies (Tobias, 2000, Aswani & Lauer, 2006). Changes in habits of use due to contamination can thus present real challenges to community and personal identity as well as significant health and economic impacts. While a response to contamination may involve a number of engineering, public health and economic approaches, the development of resilience strategies may also be important.

Communication and Human Resilience

Human resilience is usually conceptualized as a psychological predisposition to respond to disruption in ways that facilitate well-being (Buzzanell & Houston, 2018). A more nuanced

approach to understanding human resilience conceptualizes resilience as an internal process by which individuals enact well-being, make sense of a disruption, and work towards constructing a 'new normal' (Buzzanell, 2010). Often this is reliant upon social ties, and the capacity of these ties to facilitate access to social, cultural, and economic capital (Bourdieu, 1973; Lee et al., 2016). Afifi et al. (2016) wrote, "social relationships have the strongest influence on whether someone can adapt positively to adversity (N.P.)." Social capital in the form of networks and resources available through relationship ties, is a primary factor facilitating recovery in disaster scenarios (Aldrich, 2012). The reliance of human resilience on social support often leads to intersections between human resilience and community-level conceptions of resilience. Individuals responding to a crisis do so within a larger social and technical system.

The Communication Theory of Resilience (Buzzanell, 2010) highlights communicative aspects of social and community resilience. Buzzanell suggests that resilience is a function of communication processes developed, sustained, and grown through discourse and interaction, as well as material considerations (Buzzanell, 2010). It is a social and collective process by which individuals can reintegrate and reorder following some serious disruption and then co-construct a new normal.

Five interrelated sub-processes constitute resilience - (a) crafting normalcy, (b) affirming identity anchors, (c) maintaining and using communication networks, (d) constructing alternative logics, and (e) foregrounding productive action while backgrounding negative emotion. In crafting normalcy "people say and do things to put their lives back in order, to achieve normalcy" (Buzzanell & Houston, 2018, p. 3). Activities that are familiar routines, that allow for reconnection with established patterns of interaction and behavior, that allow of normal access to resources can help reestablish a sense that life has returned to normal after some disruption. Water contamination

crises, as described earlier, often disrupt patterns of water use, requiring boiling water, use of bottled waters or water filters. Communicating and establishing use routines or returning to pre-contamination patterns of use may help craft normalcy. Identity anchors are "relatively enduring cluster(s) of identity discourses upon which individuals and their familial, collegial, and/or community members rely when explaining who they are for themselves and in relation to each other" (Buzzanell & Houston, 2018, p. 4). These discourse clusters may include identify narratives, roles, relationship clusters, affiliations, and membership in families, organizations and communities. Communication networks are important sources of support providing information, resources and the capacity to coordinate a response. In addition, networks can facilitate collective action in response to major disruptions. Buzzanell's fourth component, alternative logics, involves sensemaking through "transformative action when old ways of behaving fail to make sense or are no longer an option" (Scharp, Kubler & Wang, p. 211, 2020). Alternative logics are about change through what may seem like contradictory ways of talking and acting that may reframe the situation. Finally, legitimizing negative feelings, while foregrounding productive action, acknowledges the inherent negative affect associated with severe disruptions while emphasizing efficacy in response.

The communicative conceptualization of resilience also highlights the interconnections between individual, organizational, community, and societal levels of analysis for resilience. For instance, Buzzanell (2010) describes the communication processes that function across levels, arguing, "The construction of resilience is a collaborative exchange that invites participation of family, workplace, community, and interorganizational network members" (p. 9). These elements emphasize the multi-dimensional, interactive, and emergent aspects of resilience that can be developed concurrently across various levels. Because of the capacity of Communication Theory

of Resilience in examining processes at both the individual and the community level, this theory was selected as one of the primary tools of analysis in the examination of key informant conversations described in Chapter five.

Houston (2015) assesses and synthesizes resilience literature and proposes some corollaries to the Communication Theory of Resilience. They suggest that community resilience is a function of communication systems and resources, community relationships and attributes, and strategic communication processes. The broader communication ecosystem is comprised of various features, such as media resources, sources of information, infrastructure, and the communication activities of citizens and organizations, as well as multifaceted community relationships, connections, and associations between citizens, organizations, government, or media. These relationships contribute to resilience through constituting both functional networks along with sources of social capital and social support. Additionally, community resilience is associated with flexibility, creativity, efficacy, diversity, equality, social justice, and economic resources. Thus, the communication field offers a robust and diverse approach to resilience that reveals critical interconnections between individuals, community, and society, as well as an invitation to respond to adverse conditions with creativity and innovation.

This approach to communication and resilience is also reflected in the Communities Advancing Resilience Toolkit (CART), a framework that assumes a uniquely prescriptive approach towards strengthening community-based resilience (Pfefferbaum, et al, 2013, 2015). CART is a community-based method of community intervention assessment for building community resilience. Pfefferbaum et al (2013) suggests "Community resilience entails the ability of community members to take deliberate, purposeful, and collective action to alleviate the detrimental effects of adverse events" (p. 251). The approach is based on four interrelated domains:

connection and caring, resources, transformative potential, and disaster management. Connection and caring includes "relatedness, shared values, participation, support systems, and equity" (p. 253). Community belonging and commitment through participation in community organizations and activities facilitate cooperation and civic engagement. The resources domain includes the range of natural, physical, information, human, social, and financial resources available to a community (p. 252). Third, transformative potential references "the ability of communities to identify and frame collective experiences, examine their successes and failures, assess their performance, and engage in critical analysis" (p. 253). Finally, disaster management in the CART framework includes the activities of prevention and mitigation, preparedness, response, and recovery. These domains are connected and integrated through communication processes, which was included as a fifth factor.

> (1) communication is a mechanism for fostering connection and caring;
>
> (2) communication channels are part of a community's resource base;
>
> (3) communication is necessary to transmit information that enables critical reflection, skill building, and transformation; and
>
> (4) communication is fundamental for effective disaster management (Pfefferbaum, 2013, p. 253).

Pfefferbaum and colleagues (2015) concluded that the sourcing and sharing of information is of paramount importance in effective community-based resilience, and that "community resilience is reinforced by clear, accurate, timely, and effective communication among community members, between authorities and community members, and across community boundaries" (p. 193). This mirrors the observations of other frames of resilience research discussed above, indicating clear consensus as to the importance of communication in the resilience process. Because of the direct, prescriptive focus on issue management and recovery described in the CART

framework, CART was selected as one of the primary tools of analysis for the evaluation of town meetings described in Chapter four.

Collective Action

Collective action can be simply understood as strategic behaviors taken together by a group or community in identifying and contacting individuals, motivating them to take some action and organizing and coordinating their actions to achieve some shared goal (Bimber, Flanagin, & Stohl, 2005; Meinzen-Dick et al. 2004). These strategic behaviors typically stem from shared values, a shared vision, and a shared plan of action across the community. They may also take the form of emergent organizations undertaken to respond to some emergent or unmet need(s) or achieve political influence external to the community (Drabek & McEntire, 2003).

In an effort to describe processes for effective collective action towards environmental decisions, Senecah and colleagues have offered a practical framework called Trinity of Voice (TOV) (Senecah, 2004, Walker, et al., 2006). This approach, developed from experiences working with stakeholders and communities to effectively address environmental issues, is grounded in a recognition that communication and collaboration are essential. Meaningful, open and respectful communicative interaction among stakeholders is necessary to promote collaboration among communities, organizations and governmental agencies. The three markers of access, standing and influence make up the trinity of voice.

Access requires active participation processes in ways that promote cooperative and constructive engagement. Conventional modes of public involvement in environmental decision often generate contentious, adversarial stances "escalates towards a sense of pervasive animosity, even hostility driven by distrust, frustrations, skepticism, and entrenched stakeholders' positions and motivations" (Walker et al, 2006, p. 194). Questions of blame and responsibility often

dominant, placing stakeholder in position where their voice is excluded. Similarly, highly technical information may limit stakeholder access by excluding stakeholders from understanding. Standing is the manifestation and process ensuring that stakeholder contributions are not just heard but valued, respected, considered and honored. When stakeholders come to believe that their contributions are not heard, participation diminishes. Standing can be undermined by lack of time to be heard, limitation on what can be said and by whom. Influence concerns and derives from access and standing references some level of power equity and symmetry between stakeholders such that mutuality is achieved. Trinity of voice is grounded in the agency and efficacy of stakeholders as manifest through communication processes. Stakeholders who have voice are able to participate in deliberations in meaningful ways. Voice may also be associated with the development of resilience as a method for foregrounding positive action and crafting an identify of efficacy. Because of the direct use of public participation in meetings and events in this frame, TOV was chosen as one of the primary tools of analysis for the evaluation of public meetings described in Chapter four.

For collective action to take place there must be a broad, concerted, community wide process of structuration to position the system for collective action. This process usually takes the form of a social movement, and entails forming mobilization potentials, creating and employing recruitment networks, arousing motivation to participate and removing barriers to participation (Klandermans & Oegema, 1987). A key process underlying collective action is interpersonal interaction through strong informal ties, often intersecting with existing local organizational structures (Diani, 1992; Pretty 2003). Strong informal ties are complexes of love, affection, obligation, and are difficult to measure and conceptualize, but can be identified through direct engagement with a target community (Purkayastha & Subramaniam, 2004). Engagement and

integration with local entities, activities and organizations are associated with the capacity to create collective action in response to a disruption (Pfefferbaum, et al, 2013). In addition, social capital may be built and manifest through collective narratives and these can impact post-disaster recovery. Narratives can facilitate response and recovery by emphasizing strong work ethics and the community's previous experiences in working together to overcoming challenges. In this way, narratives can help create a sense of efficacy and resilience (Chamlee-Wright & Storr, 2011). Local political structures, strong leadership, and distributed social capital are also central to processes of collective action.

Gray et al. (2005) argues that local political structures are the most significant predictors of collective action, as these structures shape the ideology of the community and determine which interest groups hold power within the community. Gray highlights a number of community studies in rural communities that illustrate that even when local people strongly believe their community to be united and cohesive, social marginalization and exclusion occur due to underling racial, religious, and social prejudice, creating enduring barriers to collective action (Gray, 1992). Purkayastha and Subramaniam (2004) also note the importance of interaction across identity categories such as race, gender, class, or culture, based on shared experiences to cultivate connectivity within the network and develop shared values and goals prior to collective action. Shared networks, values and goals are resources that may be used in responding to disruptions.

Democratic engagement and social capital

The principles of direct democratic engagement undergird collective action, and neither process can exist without the other. By its nature collective action is the joining together of participant voices with divergent experiences, opinions, and goals, to collectively make decisions and enact those decisions. Collective action has been found to be a powerful driver of the

emergence of democratic institutions, and vice versa (Fearon et al. 2015). Collective action may be required to achieve a holistic community-wide response.

A critical part of collective action processes is the cultivation of social capital internal to a community. Collective action is often assessed in terms of its creation and utilization of social capital. According to Diani (1997), "Social capital is social relations through which resources circulate, and trust and norms are generated and reproduced" (n.p.). In other words, social capital is a form of strong and stable ties based on sentiments of mutual trust and mutual recognition/obligation, through which actual and potential resources are linked (Bourdieu, 1986). Trust is a general organizing principle which induces and maintains structural logics within a social network and is often used to assess social capital and the potential for collective action within movements (Lusher et al., 2012). Trust is key to civil and democratic processes, and facilitates bonding, identification, and group formation necessary for social movements (Putnam, 1993). According to Roger and Singhal (2003), "attention to mutual trust allows us to differentiate between social capital and other forms of stable interactions driven by instrumental calculations" (n.p).

Social capital as relations through which resources for collective action are generated is related to the network concept of social support. Social support can be understood as social and community ties through which individuals draw emotional aid, material aid (goods, money, and service), information, and companionship (Walker et al. 1994). Tie strength is highly associated with support, and multiplexity (multiple role relations between actors) is a strong predicator of tie strength and social support (Hirsch, 1980). Multiplexity is particularly important in the context of collective action, as multiplexity also mediates the transfer of resources in the context of other interactions and the generation of creative ideas (Lee & Lee, 2015).

The Social Capital Assessment Tool (SOCAT) developed in 2001 by the World Bank synthesizes conceptualizations of social capital into two fundamental dimension – structural and cognitive social capital (Grootaert, & Bastelaer, 2002). This division while simplistic adequately summarizes the majority of disparate aspects of social capital. The structural dimension contains networked components of a social group – organizations, leaders, key actors, the relational ties between them, and the resources that move through those ties. The cognitive dimension includes the attitudinal aspects of the individuals that mediate the social capital, including trust, norms, values, and beliefs. This conceptualization provides direct metrics by which social capital in the context of collective action can be evaluated and understood at both the level of the individual and the state. For the reason, the SOCAT framework was selected as one of the primary tools of analysis used in the analysis of key informant conversations described in Chapter five.

Collective action can also be understood as a process of *scaling up* – of taking issues, processes, and understandings outside of the spatial constraints of a singular community or site and moving towards a more globalized socialization (Haines, 2018). Scale from a conventional anthropological perspective can be simply understood as the reach of actions. Coordination and mobilization function as an emergent scale, driving new capacities for actors to reach new resources and enact new forms of change (Xiang, 2008). Through coordination and mobilization communities reach external actors and engage with issues on a larger scale, The capacity of a community to come together around an issue is indicative of effective collective action. This capacity is associated with existing structures, networks and relationships in a community which some observers have suggested have declined (Putnam, 2000).

Conclusion

This review of literature provides a broad theoretical foundation for subsequent analysis. While not all conceptualizations of resilience and collective action are directly utilized as tools of analysis in subsequent phases of this research project, the ideas and concepts discussed here provide broad support and context for the remainder of this project. Chapter three will continue to build the foundation for this project through a narrative review of the history of the target community and the timeline of the PFAS crisis event.

CHAPTER 3 - PARCHMENT

Parchment is a small community in southwest Michigan, located immediately northeast of the much larger city of Kalamazoo. Known as Michigan's 'Paper City,' Parchment takes its name from the paper manufacturing company located in the city on the banks of the Kalamazoo River. The company predates the town. Parchment is a paper town in a second sense – with a population of 1800 people and occupying just under one square mile, it fails to meet the State of Michigan minimum standard of a home-rule city. The city limit is just south of the abandoned Crown Vantage Paper Mill, north of which the more rural Cooper Township begins. Cooper Township is much larger than Parchment, with a population of over 10,000 people and covering a total area of 36.6 square miles. Importantly, the City of Parchment city water system provides water to some households in Cooper Township, but much of Cooper Township operates on well-water systems. In practice, Parchment and Cooper often operate as a singular community – sharing churches, a school, a post office, and a foundational story of community origin.

Narratives of Parchment's history, including the founding of the community, previous water contamination events, and the timeline of the crisis itself, were frequently evoked in town meetings and participant conversations that were the targets for analysis in this research project. A review of this information is necessary to fully contextualize and explore those narratives as they emerged within the data. This chapter is a review and synthesis of stories in the history of the community of Parchment and Cooper Township which serves to provide context and lay the groundwork for subsequent analysis. This chapter is *not* an analytical application of narrative, but the information presented herein does serve to support later analysis in Chapters four and five.

Tellin' Tales about Narrative Theory

Stories are processes of constructing understanding (Fisher, 1984, Bruner, 2004, Foss 2009). Narration is the ordering of events and experiences in such a way so as to assign or construct meaning to them. The need for narration is a core function of the human reasoning capacity (Fisher, 1989). Narration is also a core to discourse, "in which events and happenings are configured into a temporal unity by means of a plot," and they are built around the elements of characters, conflict, place, narrator, and point of view (Polkinghorne, 1995, p. 5). Through narrative, a logic, order, and structure of meaning is imposed on experiences. As Karl Weick noted, "When people punctuate their own living into stories, they impose a formal coherence on what is otherwise a flowing soup." (1995, p. 128). Narratives frame experiences and usually follow a logical and imposed order reflecting coherence and fidelity. Narrative is linked to cognitions and memory and is generally grounded in a constructivist approach (Bruner, 1987). Narrative coherence, the degree to which a story hangs together and makes sense, is a function of the structure of the narrative and consistency with other stories. Narrative fidelity concerns the credibility or reliability of the story (Fisher, 1984, 1989).

Community stories are extremely important. Shared stories are essential to creating community by encoding and communicating memories, values and experiences (Hinchman & Hinchman, 1997). They can provide a holistic, ecological understanding of community stakeholder's system of experiences (Olson, et al, 2016). Storytelling is the process by which internal and external members of communities construct community identity (Boje, 1991). Even in contexts such as health-related crises where coherence and fidelity may seem lost, the search for sense-to-make can itself become a story (Frank, 1995). Narratives are storied systems for constructing, containing and communicating what is known (Hinchman & Hinchman, 1997).

Muddying the waters around 'Community'

Who gets to count as part of a community is arbitrary but important, both in conducting community-based research and in telling community-based stories. Community belonging may be a question of identity. McMillan (1996) articulates community in terms of four elements - "a spirit of belonging together, a feeling that there is an authority structure that can be trusted, an awareness that trade, and mutual benefit come from being together, and a spirit that comes from shared experiences that are preserved as art" (p. 315). A sense of shared history is also important to a sense of community, and community can function without being geographically adjacent. Fincham (2011) explored Palestinian communities across South Lebanon. She found that despite not having shared geographic boundaries or formal institutions, Palestinian people shared strong communities constituted primarily through stories of their history.

Communities are often defined by and historically associated with bodies of water. Michigan, for example, is known as the Great Lake State. Rivers in particular are often used as markers of boundaries, and ownership of waters is often directly connected to identity (Cusack, 2010). The significance of water in national identity is illustrated through the River Jordan, which runs along the borders of Israel, Palestine, Jordan, and Syria and plays important roles in the mythic narratives of all of these countries (Prince El Hassan bin Talal, 2016). In Michigan law all bodies of water are publicly owned, and the boundaries of private property are defined by the high water mark of rivers, lakes, and streams (Olson, 2006). The city of Kalamazoo is named for the Kalamazoo River, which in turn comes from the Potawatomi word *kikalamezo*, meaning 'the place where water boils'. The Potawatomi were the original community inhabiting Southwest Michigan, and the name is in reference to their legend in which a warrior is tasked to run from his village to the river and back before a pot of water boils (Romig, 1986).

Community also is an external construct, used by external actors to place boundaries and barriers around groups of people. So it is in the case of this dissertation project, where an arbitrary boundary of community has been drawn around the people of Parchment and Cooper Township. The primary justification for this boundary is the contamination which is the focus of this project. The site of the PFAS contamination is the Crown Vantage paper plant, situated just north of Kalamazoo City along the banks of the Kalamazoo River. The river flows north and disperses the contaminant through the north-central region of the Kalamazoo watershed, and so the two municipalities dependent upon the contaminated water are Parchment and Cooper Township. The City of Parchment water service area, which includes both the city and the township, was the water system wherein PFAS was initial detected and is where most of the response has been focused. This area is shown in Figure 2.
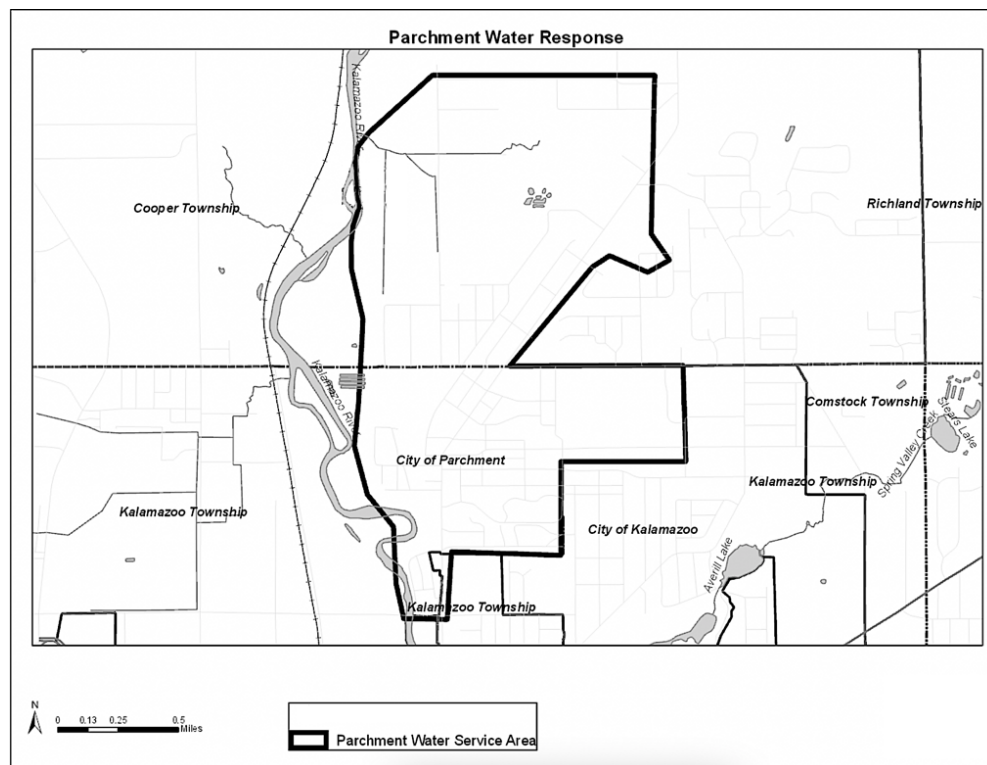
Figure 2. Map of Parchment and Cooper Township (Cooper Township 1, 2018).

The two municipalities also meet McMillan's criteria for having a shared sense of community. In conversations the researcher had with actors in both municipalities, they spoke of Parchment and Cooper Township as a single shared community. Commitments of moral responsibility were articulated across both people from both municipalities, showcasing an awareness of mutual benefit towards one another. Members of both municipalities articulated feelings of ownership towards the same public spaces and public art in the form of local architecture and parks. Finally, although there are separate local governments for Parchment and Cooper Township, they share most of the same institutions, including schools, churches, libraries, and a post office. Some community members directly told the researcher that they wanted to be thought of as a singular community.

Paper Stories

Page one: Putting pen to Parchment

The founding story of Parchment and Cooper Township is an etiological founding narrative, rooted in the entrepreneurial mythology of the early twentieth century. Founding stories provide explanations for the values, traditions, and structures of communities (Boje, 2008). These stories help create and communicate a shared identity, provide inspiration, reference important values, and regulate behavior (Foroughi, 2020). Founding stories of communities seek to convey a cultural identity, value system, and larger principles of social organization. They often abandon elements that distract from a coherent story-line, emphasizing success and overcoming hardships.

The founding story of Parchment Michigan and Cooper Township is the story of Jacob Kindleberger, the captain of industry who founded the Kalamazoo Vegetable Parchment Company (KVP) in 1909 (Parchment Community Library, 2021). Kindleberger remains a prominent figure

in the community, memorialized in public records, monuments, and parks (Horness, 1949, Parchment Community Library, 2021, Parchment City Government, 2021). His name can be heard in school reports and the public speeches of community leaders to this day. The origins of the Parchment community presented here draws on public records, news stories, and the 1949 biography *The Life of Jacob Kindleberger* by Carol Honess.

Kindleberger immigrated to America from Germany in 1880 with his family. He worked in an Ohio paper mill throughout his childhood. Kindleberger "came to the United States as a half-blind immigrant boy and began life almost without education yet became one of most successful businessmen of his time" (Honess, 1949, p. 2).

Kindleberger was also Christian. At age 15, he had a conversion experience at a Methodist church service. The event changed his life.

> The future had meant nothing to him before but now it meant everything. He felt singularly lost for even though fifteen years old, he was still unable to read or write, always excusing himself on the grounds of his eyes (Honess, 1949, p. 4).

As a result, Kindleberger became active in the church and learned to read and write. He would also get glasses to correct his vision. He soon began preparing for a career as a preacher. He financed his education by working as a salesman.

Kindleberger excelled at sales. Kindleberger ultimately abandoned his ministry dreams and became a full-time, traveling salesman. He sold paper in the U.S., Canada, and Mexico. Parchment, a paper product useful in the food industry due to its resistance to water and grease, was becoming popular to produce in Kalamazoo, Michigan around this time. Kindleberger saw opportunity (Honess, 1949).

In 1909, Kindleberger founded KVP. Kindleberger created a successful paper company using only an abandoned sugar beet factory, the famously abundant lumber of historic Western Michigan, and his know-how. The company enjoyed almost immediate success producing paper

for home use, parchment paper, wax paper and later bond paper for printing (Honess, 1949). The company would also later produce food packaging and add printing presses to its operations for a growing printing business.

Most importantly to this story, Kindleberger fathered a residential community for his workers (Honess, 1949, Kalamazoo Public Library, Friday, April 16, 2021). Kindleberger purchased large-swaths of land surrounding the mill and sold parcels to the workers. Kindleberger, endearingly called "Uncle Jake," is portrayed as a benevolent figure. For example, in numerous stories, he regarded his employees in the same esteem as extended family (Honess, 1949; Kalamazoo Public Library, Friday, April 16, 2021). Not to distract from the heroism, but Kindleberger profited handsomely from this real estate venture. Many homes built for KVP workers remain in use as residences to date.

Over time, the company and the company-town grew. A company produced pamphlet from 1927 describes the emergence of the community thusly:

> A little village known as Parchment nestles in the crook of the rivers arm and picturesque bungalows peep at one through bowers of roses. Modern and convenient homes surrounded by spacious lawns and delightful gardens fringe the bowered road and a well-equipped school building provides for the children exceptionally fine education advantages. The community idea is strong. . . And last but by no means least, the spiritual food necessary to a robust and well-rounded manhood and womanhood is provided by a Sunday school and undenominational services held regularly there in (Kalamazoo Vegetable Parchment Co., 1927)

The company continued to expand and innovate with new products, and Uncle Jake invested in the growing community of Parchment. A 40-acre central park was built under his direction as part of his vision of a model city, and Kindelberger Park remains a fixture of the community today.

In 1930, 511 people lived in the community, and it was formally designated a village (Parchment, The Paper City, 1976). In 1939, the community around the mill voted to incorporate

as a city. By the 1940s and 1950s, KVP employed over 1700 people. KVP was called "the world's

model paper mill" (Honess, 1949). Jacob Kindelberger died January 1, 1947. His obituary reads,

in part, "he was never happier than when he was in the midst of the community and close to the

mill that gave it being under his long supervision." (Kalamazoo Gazette, January 1, 1947).

Turning the page: Deterioration of Parchment

The paper industry began to decline around mid-century. The decline accelerated in the

1960s and 1970s (Mann, May 12, 2016). Consolidation in the industry marks this period. In 1960,

KVP merged with the Sutherland Paper Company. In 1966, the Brown Company bought KVP-

Sutherland. In 1980, James River Corporation bought out Brown Company. Crown-Vantage

operated the Parchment facility from 1995-2000, followed by the Georgia-Pacific corporation.

Georgia-Pacific, the last company to manufacture paper in Parchment as part of its Dixie division

closed the last Parchment plant at the end of 2015, eliminating the final 57 jobs on site. In a press

release, Julie VanDeWater, a Georgia-Pacific spokeswoman said,

> This is a strategic decision based on our business needs and ability to be competitive
> long-term and has nothing to do with the quality of work from GP's employees at
> the plant. . . The employees have operated the facility safely and effectively for
> many years (Mack, May 11, 2015)

The abandoned plant looms close to the center of Parchment, between the city and the

Kalamazoo River. Media reports describe the plant as bighted. It illustrates post-industrial decay.

When the plant shut its doors, the era of paper making in the paper city had ended.

Wayward waters: Context through a past contamination event

The story of Parchment and Cooper Township is also a story of crisis and disaster. Stories

about disasters carry meaning and lessons and frame larger public understanding of risk, harm,

cause, and responsibility (Seeger & Sellnow, 2016, Sellnow, et al, 2019). These narratives help communities make sense of what happened and why it happened. These stories may identify villains and heroes and communicate caution about future risks (Zoller, 2012). They may also help to heal. That is to say, narrative making may also support adaptive-transformational processes and productive change during and after severe disruptions (Buzzanell, 2018). Crisis narratives fill the discursive space created by the uncertainty that follows a severe disruption (Sellnow et al., 2019). They can help facilitate crisis decision making and motivate actions (Liu, et al., 2020).

Narratives of water contamination, like other crisis stores, feature heroes, villains, and tragedies as points of conflict that drive plot (McCann, & Haltom, 2008, Seeger & Sellnow, 2019). Like other crisis narratives, themes of blame, responsibility, and harm are often central to the story-line. Burgess (2019) writes that narratives of environmental risks, such as water contamination, emerge with public concern over the impact of these events and are characterized first by warnings, then by denial of responsibility and of the level of harm. These narratives of risk and blame develop a causal and temporal frame to identify responsibility. In so doing, the narratives often demand accountability and redress. Crisis narratives are particularly relevant to contemporary environmental risks (Burgess, 2019). Victims are identified and portrayed with varying degrees of agency in responding to some conflict, which drives the plot. In addition, these narratives intersect with personal and community stores of illness and health as well as the lingering uncertainty and anxiety over health (Zoller, 2012). Narratives of water contamination are also stories of place (Moors, 2019). The specific features of places such as Flint, Michigan. Love Canal, New York, Hanford, Washington, or Parchment, Michigan are important parts of these contamination stories.

PFAS contamination was not the first water crisis to impact Parchment. In July 2010, the oil pipeline B6, operated by the Canadian company Enbridge, ruptured into a tributary of the

Kalamazoo River. It is one of the largest inland oil spills in US history: 843,000 gallons of heavy crude oil coated 39 miles of the river, primarily upstream of Parchment (Kalamazoo Water Keepers, 2018).

The oil spill was a "wakeup call" for many. It prompted a reexamination of oil pipeline safety throughout the Great Lakes region (Devereaux, 2020). In one media report, a resident said "'I think I can sum it up in one word and that is nightmare. . . The smell, I don't even know how to describe the smell, there are no words. You could not be outside'" (Williams, December 29, 2020). The US Environmental Protection Agency oversaw the response, coordinating federal, state and local agencies in response (EPA, 2018). Cleanup efforts took five years, and cost over $1.2 billion, and the bottom of the river remains slick with oil to this day.

In medias res: The PFAS Contamination Story

The PFAS crisis in Michigan began in 2010, when the State of Michigan found high levels of PFAS chemicals in Oscoda, Michigan. Oscoda was the home of the Wurtsmith Air Force Base which had used Aqueous Film Forming Foam (AFFF) for fire-fighting, and PFAS from the foam contaminated area groundwater, surface water, and even the flesh of fish and wildlife. The base had been decommissioned in 1993 and the US Air Force claimed it had no responsibility related to the contamination. The chemicals had been manufactured by the 3M Corporation. In the 1950's 3M developed PFAS chemicals for water-proofing, including the commercial product Scotchgard, a treatment for paper-products. In the 1960s, 3M began developing AFFF used in military and commercial aircraft firefighting (3M, 2021).

The Flint Michigan water crisis contributed to a heightened sensitivity to water contamination issues from the state, and the Oscoda case prompted the State of Michigan to conduct additional testing beginning in 2017. The first sites of serious contamination were found

in Rockford, Michigan. Rockford's extensive contamination was associated with Wolverine World Wide, a major shoe manufacturer. Wolverine used PFAS chemicals for leather tanning and waterproofing. Rockford, like Parchment, saw very high levels of PFAS contamination associated with a company that played a central and foundational role in the community, its economy and identity (Matheny, 2019). The similar pattern of circumstances, common Principle Responsible Parties (PRPs), and shared struggles of Oscoda, Rockford, and Parchment created points of connection and cooperation between these three communities.

As part of statewide PFAS tests following the discovery of contamination in Oscoda, the Michigan Department of Environmental Quality discovered high levels of contamination in the Parchment city water system in July of 2018. Residents of Parchment were informed within hours that their water was contaminated and that they should immediately use alternative sources for drinking (Devereaux, 2019). The announcement below was sent to those residents who were using the city water system:

> Your home has been identified as being serviced by the City of Parchment Water Supply system. High amounts of PFAS have been found in the City of Parchment water supply. The Kalamazoo County Health and Community Services Department in unison with the Michigan Department of Health and Human Services, Michigan Department of Environmental Quality, the City of Parchment and Cooper Township is advising you and your family to immediately stop using their water for drinking, cooking, making baby formula and food, or rinsing fruits and vegetables (Health Department Letter, July, 27, 2018).

The notice also included information about bottle water distribution and links to a variety of resources for additional information, including the Agency for Toxic Substances and Disease Registry and the Centers for Disease Control and Prevention. Parchment High School was selected as the primary site for water distribution, and community volunteers were recruited through the high school communication network.

Plans were also outlined for draining the City of Parchment water system and connecting it to the City of Kalamazoo system. A state of emergency was declared by Michigan's Lt. Governor Brian Calley on July 29th and residents were told that there would be daily updates posted to government websites and that a telephone hotline had been established. The first of several town hall meetings was scheduled for Tuesday, July 31, 2018. This meeting was held in a local church, the Haven Reformed Church, and included politicians, subject matter experts, members of the community and representatives of the regulatory agencies. An estimated 800 people attended. Handouts were distributed with background information (Cooper Township 1, 2018) as well as power point slides as part of a general presentation about PFAS including its impact on public health, the distribution of contamination (Cooper Township 2, 2018) and the role of agencies in response. Additional information was distributed by the Cooper Township government about distribution sites for bottled water.

The draining and flushing of the Parchment City water system began in August and the Township issued instructions for flushing water in residents' homes (Cooper Township 3, 2018). Plans were also released about regular monitoring of surface, groundwater and well water. The City of Parchment arranged quickly to connect to the Kalamazoo municipal water system as a temporary measure with some suggestion that this might also be a long-term plan.

In late August of 2018, Cooper Township announced the distribution of home water filters for residents who were using private wells for their drinking water.

On August 27, 2018 it was announced that the "do not drink order" was lifted. The announcement read as follows,

> After extensive testing for PFAS and several other parameters, including lead and copper, state and federal health and safety experts have deemed the latest results [*for the Parchment municipal water*] meet state and federal standards and the water is now safe for normal consumption (Kalamazoo County Government, August 27, 2018)

While the transfer to the Kalamazoo water system addressed the problem of ongoing consumption of contaminated water by most residents, those on private wells still had contaminated water. Throughout late August and early September 2018, attention turned to monitoring private wells and updates were provided about the numbers of wells tested. In addition, agencies continued to distribute information to the community through flyers and provide links to other sites for additional information.

Questions of blame, responsibility and accountability for the contamination were explored through ongoing testing at the plant, most recently owned and operated by Georgia-Pacific, a world leader in the distributors of tissue, pulp, paper, toilet and paper towel dispensers, packaging, building products and related chemicals (Georgia-Pacific, 2021). Georgia Pacific is part of the larger Koch Industries.

In early October, the Kalamazoo County Government issued this statement:

> Michigan Department of Environmental Quality (MDEQ) announced this week that Georgia-Pacific, LLC, will be working closely with the State to identify the source(s) of per- and polyfluoroalkyl substances (PFAS) that affected the City of Parchment's water supply and private drinking water wells in the City of Parchment and Cooper Township. Georgia-Pacific has voluntarily agreed to develop and implement the planned hydrogeological study in the area, at its own expense, and under the MDEQ's supervision (Kalamazoo County Government October 4, 2018).

This joint hydrogeological study involved establishing monitoring wells and maps were distributed to the community with planned locations. On October 13, 2018 the Michigan Department of Environmental Quality issued an approval of the Georgia-Pacific hydrogeological investigation plan (Cooper Township 4, 2018). The results of monitoring began being reported in January of 2019.

Narratives of crisis often include issues of blame, responsibility and accountability. On November 1, 2018, a federal class action lawsuit alleging 3M and Georgia-Pacific were responsible for contaminating Parchment's municipal drinking water was filed (Barrett, November 1, 2018). The suit claimed that 3M and Georgia-Pacific engaged in a "disinformation and deceit" in a manner that allowed PFAS to be used decades even after they had determined the chemicals caused negative human health effects. "Defendants knew or should have known of the likelihood that PFAS contamination would migrate into plaintiffs' drinking water" (Barrett, November 1, 2018).

On April 8, 2019, the Michigan Department of Health and Human Services announced plans for Parchment's participation in a study assessing PFAS exposure levels conducted through the Agency for Toxic Substances and Disease Registry (CDC, September 23, 2019). Efforts were directed to encouraging residents to enroll in these studies.

On April 23rd, an additional town meeting was announced.

> On April 25, 2019, Senator Sean McCann will hold a Town Hall meeting at Parchment High School. This community meeting will focus on ongoing response from state and local officials to PFAS in Michigan. Representatives from the Michigan PFAS Action Response Team (MPART), the Michigan Department of Environment, Great Lakes, and Energy (EGLE formerly MDEQ) and MDHHS will present information about the state-wide response and provide a status update on PFAS contamination in Kalamazoo County (Kalamazoo County Government, April 23, 2019)

On May 30, 2019, the results of the hydrogeological study conducted by a consulting firm Tetra Tech on the behalf of Georgia-Pacific were released. The report concluded that:

> Facilities associated with the former Crown Vantage paper plant appear to be a source of PFAS compounds in groundwater. There appears to be other PFAS source(s) east of the former City of Parchment municipal well field (Tetra Tech, May 30, 2019).

The identification of the source of the contamination, along with the connection of Parchment to Kalamazoo city water brought to closure many parts of the contamination story. What remained were questions of accountability.

On October 25, 2020, the City of Kalamazoo reached a settlement with Georgia-Pacific and 3M over PFAS contamination in the City of Parchment and Cooper Township. The settlement of $5.4 million was to subsidize the cost of connecting affected homes with the Kalamazoo water system. According to a spokesperson, this settlement avoided lengthy and costly litigation. City Attorney Clyde Robinson said of the negotiations. "There was a little bit of give and take. Obviously the paper companies wanted to, I don't want to say get out of it as cheaply as they could, but they recognized there was some cost and risk in going forward, and they had an initial figure they presented to us" (Kriss, Oct 26, 2020). Additional litigation by the State of Michigan and class action suits by residents filed soon after the contamination continue. In commenting on PFAS litigation that included the Parchment contamination, Michigan Governor Gretchen Whitmer said, "Companies that are responsible for these contaminants must be held accountable. . . Polluters must pay. It's time that these companies step up and take responsibility and address what has taken place" (Egan, 2020).

On April 25, 2021, a $11.9 million settlement was reached in a lawsuit filed by Parchment City residents against 3M and Georgia-Pacific. The complaint, which had been filed in the Western District of U.S in November, 2018, alleged PFAS from the mill site had contaminated water throughout the city, and sought monetary damages for property damage, diminished property value, stigma damages, interference with use and enjoyment of property, noneconomic damages, exposure to PFAS and medical monitoring (Devereaux, 2021). The lawsuit claimed that 3M sold the chemical despite knowing of the dangers, and George Pacific and its predecessors in the area

failed to correctly secure the landfill against leakage. Neither company conceded liability or wrongdoing (Bissell, 2021).

On April 28, 2021, The US Senate passed the Drinking Water and Wastewater Infrastructure Act of 2021, which included two specific amendments related to PFAS contamination. The bill distributes funds for PFAS detection and clean-up to every state in the United States, allocates funds for new research into long term health impacts of exposure, and makes available zero-interest loans for private citizens needing well replacement. The bill is the result of a renewed surge in public advocacy for water rights in the United States, of which Parchment and Cooper Township residents have played a big part (Dennis, 2019).

During the Parchment contamination event, several communication modes were used to distribute information to residents. These included web sites and press releases, community town hall meetings, flyers, telephone hotlines, and videos. Messages focused principally on technical issues, remediation efforts and updates on these efforts, health effects and ongoing investigations, including hydrogeological studies to assess sources and distribution of contamination and investigations of human health impacts of exposure to PFAS contaminated drinking water. Much of the technical information was drawn from other sources, such as the Centers for Disease Control and Prevention and the Agency for Toxic Substances and Disease Registry. Communication processes were more intense and frequent at the onset of the crisis and became less frequent over time. In general, governmental agencies such as the Michigan Department of Health and Human Services struck a tone of openness and transparency in interacting with the public. The three major actions taken in response to the event were to connect Parchment to a different water system, conduct an investigation to determine the source of the contamination, and initiate a long-term study of health effects associated with drinking PFAS contaminated water.

The story of the response to PFAS contamination of water in Parchment, Michigan was characterized by a series of coordinated actions and messages by government agencies around these three actions. This sequence of events as presented in Table 2 provides a temporal narrative from the identification of PFAS as a contaminant of concern, to its discovery in the Parchment water, to the immediate response, the longer-term response and some level of resolution. This sequence provides narrative fidelity by imposing a logical order to the event and helps structure other elements of the narrative, such as cause, which characters are heroes and villains, and how conflict is managed and resolved.

Table 2. Parchment PFAS timeline

1940's PFAS first produced

1950s 3M Develops PFAS for water proofing coatings

1960s 3M Develops Aqueous Film Forming Foam (AFFF)

1970's PFAS recognized as possible chemical contaminate

1990's PFAS becomes a contaminate of major concern

2007 PFAS found in 98% of blood samples taken from US adults

2015 January Georgia-Pacific closes the Parchment Plant

2018 July 24 Residents informed that their water is contaminated with PFAS
　　　　Bottle water distributed to 3,100 residents
　　　　Parchment has temporary connection to Kalamazoo water system

2018 July 29 Michigan State Government declares a state of emergency in Parchment
　　　　Flushing procedures disseminated

2018 July 31Town Hall Meeting at Haven Reformed Church

2018 August Water Filters distributed to private well users

2018 August 27 Parchment Municipal water declared safe for normal consumption

2018 September "Extremely high" PFAS discovered at the Parchment plant landfill

2018 October 4 Georgia Pacific and State Agency agree to cooperate in testing

2018 November 1Class Action Lawsuit filed against 3M and Georgia-Pacific

2019 April 8 Parchment residents encouraged to participate in Agency for Toxic
　　　　Substances and Disease

2019 May 30 State releases report tracing contamination to Crown Vantage plant

2020 October 25 City of Kalamazoo and Georgia-Pacific reach $4.5 million settlement

2020 January 14 Michigan announces polluters pay lawsuit against 17 companies for
　　　　PFAS contamination

2021 March 15 the Community Resilience and Response following PFAS study operated
　　　　through Purdue University (the research reported on in this dissertation) begins
　　　　recruitment in Parchment and Cooper Township

2021 April 23 3M and Georgia-Pacific agree to pay $11.9 million in a settlement with
　　　　Parchment City residents

2021 April 28 the Drinking Water and Wastewater Infrastructure Act of 2021 is passed in
　　　　the US senate

The Parchment story is also nested within larger stories of corporate polluters and the growing national and international PFAS contamination disaster. It is supported and humanized by individual stories of heroic response and individual and community harm, including harm to personal and family health. Many of these stories were shared in Town Meetings and the interviews presented in Chapters four and five They are stories built around emotion, and the struggle to craft resilience under conditions of high short and long-term uncertainty about health impacts, a disrupted sense of normalcy and an altered sense of identity.

Assuming a traditional narrative frame, the 'villain' in the story of Parchment could be seen as Georgia-Pacific, the company that acquired the former KVP company, closed the mill, contaminated the water and left the city with a toxic legacy. The evil corporate polluter is a well-established narrative trope in popular literature where the corporation exploits the environment for profit and by so doing, harms people, communities and the natural world (Allen, April 25, 2016). The corporation as character is often a large multi-national organization that functions outside the established norms and values of any specific community and exists merely or primarily to provide profits to owners (Little, 2014). Government regulation is inadequate or unable to protect people or the environment from harm. The corporation fails in its duty of responsibility to the community and the environment. Corporate contamination of water implicates two basic dimensions of corporate social responsibility: (1) the environmental dimension and the obligation to be a good steward of resources, and (2) the stakeholder dimension, interacting with employees and the community in appropriate ways that protect their well-being (Dahlsrud, 2008). Georgia-Pacific in the case of the Parchment contamination easily fits the trope of evil corporation.

The 'heroes' of the story could be seen as the government agencies and community members that responded and organized quickly in response to the crisis. The State of Michigan

first identified the PFAS contamination as part of a proactive state-wide assessment and officials describe the state response in Town Meetings as leading the nation in PFAS response. Interestingly, the response of the State of Michigan to 2018 PFAS contamination in Parchment stands in deep contrast to the response during the Flint Water Crisis of 2014. City officials moved quickly and decisively to notify the community, arrange for distribution of bottled water, and arrange for a longer-term solution of connecting to the Kalamazoo water system. The contamination was first reported on July 24, 2018 and by August 27, 2018 the city had flushed its system and connected to the Kalamazoo system, and the water was tested and declared safe to drink. Community organizations such as churches and schools moved quickly to organize in response to the crisis. Other agencies such as the CDC initiated the health monitoring studies to begin answering questions about shot and longer-term health effects.

It could be said that the story of Parchment's water contamination ended with the permanent connection of the Parchment water system to the Kalamazoo system and the August 27, 2018 declaration that the water was safe. The ending may also be constructed around the identification of the source of contamination and the initial financial settlement with Georgia-Pacific in 2020. Another ending could be identified in April, 2021, with the passing of the Drinking Water and Wastewater Infrastructure Act of 2021 and the settlement of the lawsuit between the city residents and the offending villainous corporations. For many in the community however the story continues, as isolated pockets of PFAS contamination as well as the lingering health impacts of PFAS consumption continue to impact the lives of the people who live there.

Conclusion

Narratives of Parchment and Copper Township's history are core to how the community navigated the issues of PFAS contamination. The narratives reviewed here provide general context

for an integrated analysis of the community's response to issues of PFAS contamination through processes of resilience and collective action. How these narratives manifested as specific themes within the public meetings organized around these issues and the personal experiences of individuals within the community will be elaborated on in Chapters four and five. Personal narratives of the research process will provide further context underlying this research project in Chapter six. Insights gained from these chapters will be integrated in Chapter seven and used to evaluate the four research questions guiding this dissertation project. To reiterate, these questions are as follows:

> **RQ1: How has the community of Parchment and Cooper Township enacted resilience towards the issues of PFAS contamination?**
>
> **RQ2: How has the community of Parchment and Cooper Township organized towards collective action to address the issues made salient by the discovery of PFAS contamination?**
>
> **RQ3: How might the community of Parchment and Cooper Township improve their capacities for resilience?**
>
> **RQ4: How might the community of Parchment and Cooper Township improve their capacities for collective action?**

The next chapter, Chapter four, begins the evaluation of these questions through a thematic analysis of Town meetings addressing issues of PFAS contamination. This chapter presents research design, analysis, and initial results.

CHAPTER 4 - MEETINGS

When a community is confronted with a significant and widespread crisis impacting its community, members need to talk amongst themselves to construct collective action in concert with response agencies and government officials. Communication processes are critical to public participation in decisions following a crisis, and for addressing the complex challenges to human health and economic development presented by water contamination (Ramirez-Andreotta, 2014). Community talk about crises is the exchange of messages to address the uncertainty and answer questions about what happened, why, and what will be the response. Talk among members is also a key prerequisite to collective action and manifest resilience. Buzzanell (2010) argues that "The construction of resilience is a collaborative exchange that invites participation of family, workplace, community, and interorganizational network members" (p. 9). Communities need discursive spaces for members to share messages about disruptive events, organize for collective action, send and receive messages, and co-construct resilience. Town meetings can provide this space. Town meetings may also serve as locations for organizing discourse necessary for collective action.

This chapter provides a review of literature and presents results of a thematic analysis of town meetings surrounding issues of PFAS contamination in the community of Parchment, MI and Cooper Township, as well as throughout the state of Michigan. This analysis is grounded in the CART framework of resilience (Pfefferbaum, et al, 2015), which posits four inter-related domains of community resilience, and Senecah's (2004) theory of the trinity of voice (TOV), which holds that effective decision-making around environmental issues requires participatory processes which promote access, standing, and influence. These theoretical frameworks were explicitly designed to examine community-based processes of resilience and collective action. In

the case of TOV, participatory meetings such as the town meetings examined in the chapter are the direct focus of the theory. In the case of the CART framework, the frame draws on relevant ideas of issue and crisis management and is strongly focused on community-based action interacting with state and local actors, organizations, and agencies.

Insights from this study are used to evaluate four research questions about resilience and collective action processes that have taken place within the community of focus. These research questions are:

RQ1: How has the community of Parchment and Cooper Township enacted resilience towards the issues of PFAS contamination?

RQ2: How has the community of Parchment and Cooper Township organized towards collective action to address the issues made salient by the discovery of PFAS contamination?

RQ3: How might the community of Parchment and Cooper Township improve their capacities for resilience?

RQ4: How might the community of Parchment and Cooper Township improve their capacities for collective action?

Evaluation of these research questions utilizes a multi-theory approach taking place across two research phases. The first research phase, described in this chapter, will be used to contextualize an integrated evaluation of the four guiding research questions in Chapter seven.

Communities Advancing Resilience Toolkit

The Communities Advancing Resilience Toolkit (CART) described by Pfefferbaum and Pfefferbaum, et al (2013) provides procedures and techniques to enhance community resilience through assessment, group processes, planning, and action. These procedures are based in existing research and are heavily field tested to ensure reliability in various community contexts. This perspective on resilience centralizes the communicative capacity of a community to come together

around issues to create resilience and sees that "a resilient community has the ability to transform the environment through deliberate, collective action" (Pfefferbaum, Pfefferbaum & Van Horn, 2011, p. 1). CART is designed to "stimulate communication, analysis and action . . . to strengthen and empower communities" (Pfefferbaum, Pfefferbaum & Van Horn, 2011, p. 2).

Pfefferbaum and Pfefferbaum, et al (2013) argue that resilience is a function of four interrelated domains that both describe and create capacity for community resilience. These are 1) connection and caring, 2) resources, 3) transformative potential, and 4) disaster management. Connection and caring includes a sense of community belonging, shared values, participation, support systems, and equity (p. 252). This includes general attitudes toward community, a sense of common values and commitment to community well-being, along with specific points of connection, such as group membership or relational ties. Resources include the natural, physical, informational, human, social, and financial resources available to the community. These include access to clean water sources, subject matter experts, leadership, and effective communication channels. CART assesses what resources may be necessary for a community to become more resilient. Transformative potential refers to a kind of community self-reflexivity that can "identify and frame collective experiences, examine their successes and failures, assess their performance, and engage in critical analysis" (p. 252). This domain also concerns the ability of a community to plan and learn. Finally, disaster management references the full range of strategies for prevention, mitigation, preparedness, response, and recovery. This includes understanding what crises and disasters a community has experienced, is likely to experience, and how it plans for response. Communication is an important unifying element of all four domains and serves the following goals:

"(1) communication is a mechanism for fostering connection and caring;
(2) communication channels are part of a community's resource base;

(3) communication is necessary to transmit information that enables critical reflection, skill building, and transformation; and

(4) communication is fundamental for effective disaster management." (p. 252)

CART, then, positions communication as a fundamental process for building resilience by connecting and integrating the other domains and as a method of empowerment by leveraging resources. This suggests that community resilience may be improved directly through an engaged scholarship approach that addresses two communication issues: enhanced community connection, and effective crisis and risk communication planning.

Trinity of Voice

Designed as an expansion of Schutz's (1958) theory of inclusion, affection, and control, Senecah's (2004) theory of the trinity of voice (TOV) proposes benchmarks against which to evaluate participatory processes in multi-stakeholder environmental decision-making. As a practical theory, TOV functions both descriptively and prescriptively, both serving to examine participatory discourse and provide guidance in designing discursive events.

Effective participatory processes, Senecah argues, is a chorus of three voices – access, standing, and influence. Stakeholders must speak with all three voices in order for decision making to truly be participatory. Access refers to opportunities, potential, and safety. A stakeholder's direct access to opportunities for relevant education and information, their potential to be heard and understood by other stakeholders, and their relative security in speaking, are all included within Access. Standing refers to civic legitimacy – the respect, esteem, and consideration afforded to each stakeholder. Influence refers to the reach of a stakeholder's voice – not that it is necessary accepted and made policy, but that the voice is heard, given respectful consideration alongside the ideas of other stakeholders, and that each stakeholder had a role in the determination of decision

criteria and the evaluation of ideas. These three voices are synergistic, and together function to allow stakeholders to interact in participatory discourse with full agency.

TOV provides a benchmarking system for the evaluation of multi-stakeholder discourse "by which to take the pulse of a process and see if it is healthy" (Senecah, 2004, p.25). Moreover, it provides clear metrics for evaluation, intervention, and design. The direct application of these three concepts – the three 'voices' identified by the theory – allows analysts to quickly identify obstacles to effective participation and correct these issues. TOV has seen wide application in the analysis of public meetings, including examination of public meetings as rhetorical artifacts and examination of community resilience and response following ecological crises (Klassan & Feldpausch-Parker, 2011).

Town Meetings

Town meetings are a form of collective discourse and action where members of a community come together, sometimes along with external actors, in a physical or virtual space around a particular issue or question. The term can specifically refer to the mechanism of direct democracy as practiced in east coast communities in the United States; however, the term can also encompass the general practice of community gathering. Town meetings rarely restrict participation based on residency, and often residents of many proximate civil divisions will gather at a single meeting. Town meetings often have theater-styled proxemics in which officials sit at the front of the room facing an audience of community members, however, format and structure vary widely (Senecah, 2004). The face-to-face encounter is an important feature of town meetings. A common form of town meeting is the town hall meeting, in which a local politician addresses and takes questions from community members, and often the terms are used interchangeably.

Town meetings provide community space for deliberation and decision-making and are widely used for risk and crisis communication on the local level (McComas, 2003).

Crisis and the Town Meeting

Crises disrupt the status quo, create the potential for significant harm, and prompt various forms of individual and social response (Sellnow & Seeger, 2021, Stallings & Quarantelli, 1985, Comfort, Sungu, Johnson, & Dunn, 2001). The responses to these and similar events often involve collective action in the form of both established and emergent organization. Throughout the lifespan of a crisis event "organization emerges in and is sustained and transformed by communication" (Schoeneborn & Vásquez, 2017). This organization in the formation of networks and structures around a crisis through communication, serves a variety of functions. Organization helps in issuing alerts and warnings widely and in a rapid manner (Vihalemm, Kiisel, & Harro-Loit, 2012). Organization can also facilitate coordination across scale, connecting local actors to stakeholder groups, and various groups to each other (Haddow & Bullock, 2003; Comfort, Ko & Zagorecki, 2004). Emergent multi-organizational networks (EMON) are networks between and among organizations that develop in response to a particular crisis situation, and often function as intersections between government agencies, corporations, community groups, and local government (Drabek & McEntire, 2003). Kapucu (2005) notes, "To act effectively in disaster situations requires sharing and using information effectively: collecting, collating, analyzing, and then deploying it promptly and in a useful form" (p. 208). Trust among actors and groups can facilitate sharing of information and the willingness to collaborate, and connections between organizations are important to the development of crisis response networks.

The core function of organization during a crisis is decision making, and as Ogrizek and Guillery (1999) note, ''In many crisis situations the essential decision to be made concerns

precisely the communication process itself'' (Ogrizek & Guillery, 1999, p. xvi). Local community meetings provide a critical space to share information, air grievances, build networks of trust among community members and stakeholder groups, and establish connections to external organizations and agencies. These critical functions are readily on display in the Town Meeting.

Town meetings serve multiple purposes during and throughout the life cycle of a crisis, including promoting awareness, sharing information, building political support, expressing concern, opportunities for networking, and enhancing participation (see Evans-Cowley, & Gough, 2008). They also have important symbolic and ritualistic elements as public performances. Town meetings are a place to express community sentiment, organize responses to risk, and build consensus about the meaning of the event.

In the context of a crisis event political structures and organizations have a tendency to shift and change, and the town meeting may be both an example of this change and a space for further emergence. Emergence is a process that occurs when communities, groups, and organizations "structure themselves as they seek to resolve the demands placed on their community in times of disaster" (Drabek & McEntire, 2003, pg. 2). Unmet needs made salient during and after a crisis event can drive people toward self-organization. Dynes (1970) describes two primary crisis conditions where emergent groups are likely to form. The first is when established emergency response and management groups are not able to assist people impacted by a disaster, for example in a situation of flooding or snowstorms where populations are isolated. The second condition is when inadequate information about the scope of the disaster, and a lack of coordination and control exists among existing response groups. In these cases, professional response groups may simply be overwhelmed and may need the assistant of emergent groups to address unmet needs and solve developing problems. The emergent groups may become involved in assessing damage, providing

and distributing food, water and supplies, and engaging in rescue and recovery efforts, among others (Stallings & Quarantelli, 1985). They may also function as sources of information for community officials seeking to keep track of casualties and continuing threats (Dynes, 1970).

Town hall meetings as direct democracy

Crucially town hall meetings are a discursive space for democratic processes to emerge around a crisis event. McComas, Arvai, and Besley (2009) describes public meetings as spaces for risk communication to support public engagement and public deliberation. This involves "intentional, careful weighing of facts and arguments prior to making decisions or informed judgments" (p. 365). While an opportunity for politicians and agencies to speak directly to a public, town halls also provide space and mechanisms for local stakeholders to speak directly to those crisis actors who have decisional authority. In addition, these rhetorical events place all actors on even footing and assigns relatively equal value and weight to all voices. This function of town meetings during circumstances such as contamination events builds on the tradition of direct democracy.

In his 1840 treatise *Democracy in America*, the French aristocrat Alexis de Tocqueville identified the then-common practice of the town meeting as one of the key forces behind the success of American democratic governance. The system of meetings, contended de Tocqueville, placed upon the average citizen an exigency towards excellence. The event demanded the participant be "well informed, as virtuous, and as strong as any of his fellow-citizens… [and] acknowledge the utility of an association with his fellow-men." (pg. 80). Although a skeptic of the strengths of democracy, de Tocqueville recognized in the meeting important mechanisms for strengthening the characters and capacities of the U.S. citizen. In his 1984 book *Strong*

Democracy, Benjamin Barker makes a similar observation, stating that U.S. democracy depends upon neighborhood associations, parent-teacher organizations, and local governing groups.

In its contemporary incarnation during a localized crisis, the town meeting functions in much the same way as in its classic formation. Beyond critical crisis response functions of information and resource sharing, the town meeting makes local stakeholders – 'victims' as they are commonly termed in crisis literature – into fully actualized crisis actors. These actors are empowered to reason around the questions of the crisis, charged to understand it and make collective decisions about the crisis - to become well-informed, virtuous, community-minded citizens of a local democracy.

Town meetings are a direct example of collective action, bringing community members together to make sense of an issue, establish plans of action, and enact decisions. Because this collective action is community-based rather than top-down, the organization better favors common over individual interests. This space creates opportunities for collective goals and identities to flourish, and more effectively arouses and maintains motivation for action (Gray, 2007). Individuals for whom collective action is a resilience process have a personal stake in the issues and are more likely to participate heavily in collective activity. Town meetings have been widely used in the response to PFAS issues in the state of Michigan and are a clear form of collective action used in the target community in managing these issues. The primacy of town meetings in the response to issues of PFAS contamination make them an ideal site for the evaluation of this project's guiding research questions related to collective action.

Town meetings and resilience processes

While the literature has conclusively demonstrated that town meetings have important functions to improve decision making and democratic processes during a crisis, these events also

seem well suited towards the cultivation of personal and community resilience during and after a crisis event. Town meeting processes intersect directly with each of the four domains of community resilience identified in the CART framework. Meetings provide a space and place for the cultivation and maintenance of social connection and the sourcing of social support, the sharing and sourcing of key resources, the generation and actualization of transformative potential, and the negotiation and implementation of disaster management.

Town meetings' collective action function, theoretically, may be understood to function as a resilience process. Community-based collective action manifest in a town meeting often follows and responds to events that disrupt normalcy, challenge identities, or contribute to a loss of purpose. There are aspects of town meeting resilience-driven collective action that may improve efficacy over other forms of political activity. Collective action enacted as resilience imbues participants with a sense of agency which strengthens the political potential of the action (Lyon, Parkins, 2013). Finally, the loss of meaning and sense of self from disruption creates a space for new logics of action, and the process of crafting normalcy *through* collective action opens space for new political forms, ideas, and strategies to emerge (Buzzanell, 2020; Seeger, Sellnow, 2016). The wide use of town meetings in the response to issues of PFAS contamination make these meetings an ideal site for the evaluation of this project's guiding research questions related to resilience. The CART framework and Trinity of voice provide analytical tools through which town meetings addressing PFAS contamination can be examined.

Method

Town meetings organized in the state of Michigan to address issues of PFAS contamination were examined to address the four research questions guiding this project. While these questions focus on the community of Parchment and Cooper Township where PFAS contamination was most

severe, town meetings at other location and in other communities were also examined in this analysis. PFAS contamination of water is a state-wide issue in Michigan, and the community of Parchment and Cooper Township is one highly visible instance of this issue. Parchment and Cooper Township were often included and discussed in meetings elsewhere. Other common topics included the issues faced by Oscoda, Michigan (contaminated by a decommissioned U.S. Air Force Base) and Rockford, Michigan (contaminated by Wolverine World Wide shoe manufacturing). Including meetings elsewhere in this analysis allowed for comparative analysis of community responses. This approach also allowed for a more holistic understanding of the response in Parchment and Cooper Township as part of a larger state-wide discourse around issues related to PFAS.

Data Collection and Procedures

The primary data for this analysis were publicly available video archives of major public meetings following the discovery of PFAS contamination in the state of Michigan. Seven meetings concerning the PFAS issues in Parchment and Cooper Township were examined, along with 19 similar meetings surrounding PFAS issues in other communities in the state of Michigan. The locations of these meetings are presented in Table 3 and visualized in Figure 3. All in all, 26 video archives were analyzed, five of which were also observed in person by the researcher, for a total exceeding 50 hours of public discourse. The dates and formats of these meetings are presented in Table 3. Some recordings were produced by local governments and archived on their official web sites. Others were recorded by citizen participants and posted to a YouTube channel. Many recordings were made public on the YouTube channel of the Michigan Department of Environmental Quality (MDEQ), renamed in 2019 to the Department of Environment, Great Lakes, and Energy (EGLE). One recording was drawn from a news outlet. In one case, one meeting

referenced by participants was missing from the video archives. A search found the recording archived on a news site. The meetings analyzed are summarized in the table below. Meetings which were observed in person by the researcher are marked with an asterisk.

Table 3. A summary of community meetings addressing PFAS issues in Michigan

Meeting Title	Location	Date
Rockford PFAS Town Hall	Rockford High School, Rockford, MI	9/12/17
Rockford Town Hall Meeting	Rockford High School, Rockford, MI	11/29/17
Wurtsmith Contamination Town Hall Update	Oscoda Township Hall, Oscoda, MI	6/27/18
Parchment PFAS contamination meeting	Haven Reformed Church, Parchment, MI	7/31/18
Milford PFAS Meeting	Milford Civic Center, Milford, MI	8/4/18
EPA PFAS contamination hearing, Kalamazoo, MI	Kalamazoo Expo Center, Kalamazoo, MI	8/5/18
Cooper Township water contamination meeting	Cooper Township Hall, Cooper, MI	9/10/18
Washtenaw County PFAS meeting*	Washtenaw Community College, Dexter, MI	12/18/18
PFAS town hall*	Mott Community College, Flint, MI	3/8/19
EPA & MDEQ Wolverine Investigation Townhall Meeting	Rockford High School, Rockford, MI	3/26/19

Table 3 continued

Crown Vantage Update Meeting	Parchment High School, Parchment, MI	4/9/19
Town Hall with Senator Sean McCann*	Parchment High School, Parchment, MI	4/25/19
Oscoda PFAS Meeting	Oscoda Township Hall, Oscoda, MI	5/22/19
Cooper Township PFAS meeting	Cooper Township Hall, Cooper, MI	6/19/19
PFAS Contamination Crisis*	Eastern Michigan University, Ypsilanti, MI	8/20/19
PFAS Lawsuit update*	Parchment High School, Parchment, MI	11/20/19
EGLE Public Meeting around PFAS amendment	Grand Valley State University, Allendale, MI	1/10/20
PFAS discussion around Arbor Hills	Virtual	3/27/20
Ludington WWTP PFAS Community Meeting	Virtual	6/29/20
Oscoda Area and Former Wurtsmith Air Force Base Townhall Meeting	Virtual	7/21/20
Public Meeting for Eaton Rapids Landfill PFAS investigation	Virtual	8/4/20
Community Meeting for Kalamazoo/Battle Creek International Airport PFAS investigation	Virtual	3/1/21
Community meeting for the Delta County Airport PFAS investigation	Virtual	3/18/21
Community Meeting for the Gogebic-Iron County Airport PFAS Investigation	Virtual	4/6/21
East Bay Township PFAS investigation Community Meeting,	Virtual	4/14/21
Oscoda area PFAS update meeting	Virtual	4/20/21
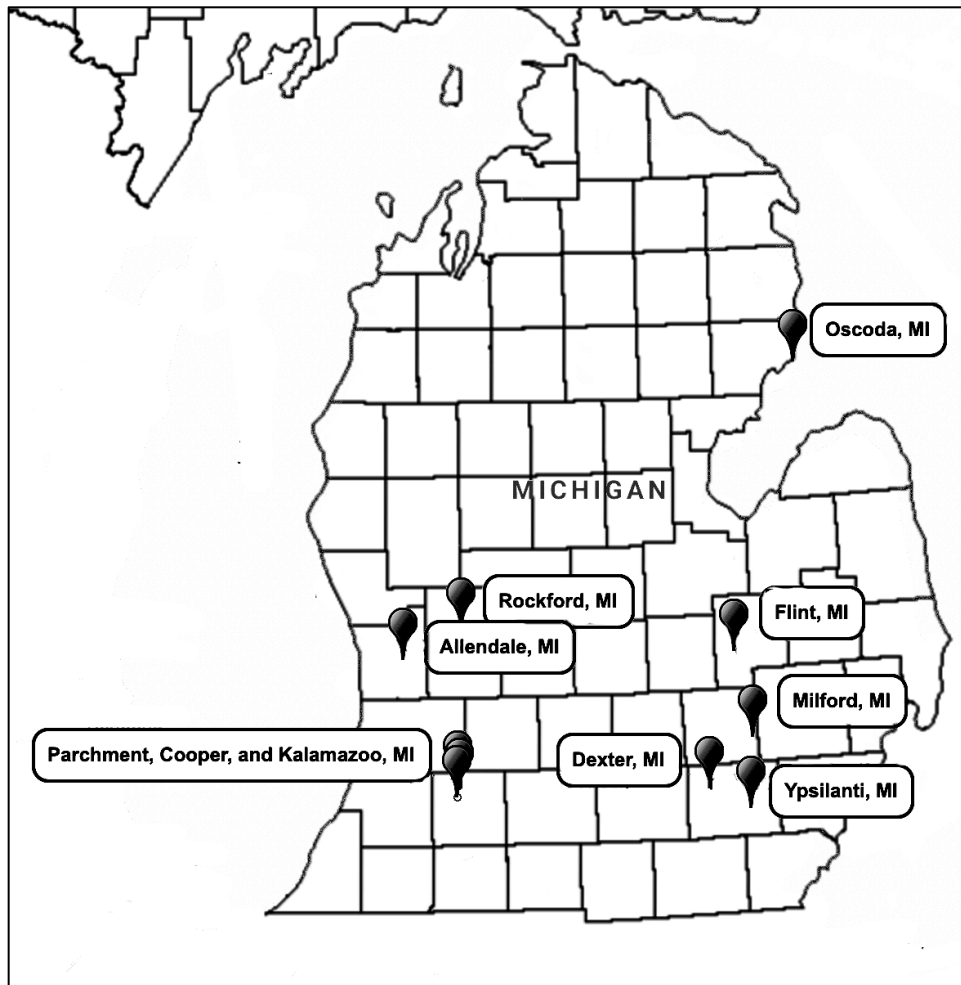
Figure 3. Map of community meetings addressing PFAS issues in Michigan

Similar approaches have been used to examine public meetings organized in response to crises. Tracey (2007) examined the discourses of crisis response to a financial crisis during school board meetings. She employed an analytic approach drawn from grounded practical theory and theoretically- informed induction. Fay & Kline (2015) employed a constant comparison approach and patterns of communication ground in the literature to examine themes of informal communication among teleworkers. Using open coding and constant comparison to identify prominent themes, Wynveen (2011) examined organized responses in two Texas counties to unconventional natural gas development.

The analysis of meetings in Parchment and Cooper Township as well as meetings in other Michigan communities with similar cultural backgrounds experiencing similar issues allows for comparative analysis of the processes of resilience and collective action across communities. General themes across meetings were examined, as well as themes specific to the community of Parchment and Cooper Township.

The initial review of the town meetings involved a chronological review of all 50 hours of video archives. This provided a sense of the relationship between the chronological development of the events and the town meetings. Notes were taken and verbatim transcription of especially memorable statements were made along with observations about the overall purpose and tone. The recordings were stopped and replayed as necessary to accurately capture statements as they were presented. This initial reading also helped refine the themes of resilience and collective action as they emerged in the meetings and informed the development of the process of thematic analysis. After this initial review, a systematic review of each meeting occurred that included more detailed recording of thematic statements of resilience and collective action. Notes were made about the frequency of the various thematic statements and the ways they were enacted by members. Efforts were also made to identify larger patterns of member response, such as statements or questions that elicited specific kinds or responses, i.e. clapping, cheers, boos, or laughter. A final review of all 50 hours of video was conducted to confirm observations about the themes and identify any issues that were missed in the initial reviews.

Thematic Analysis

Thematic analysis is a highly flexible analytic approach which can provide a rich, detailed, and complex account of data (Nowell et al. 2017). Researchers begin by becoming immersed in the data through repeated readings, in an active search for meaning and patterns (Braun & Clarke,

2006). Having achieved familiarity with the data, researchers may begin to make notes about ideas for coding in subsequent phases (Lincoln & Guba, 1985). Themes emerge from a text or data set based on the systematic and repeated reading of the text (DeSantis & Ugarriza, 2000). Themes may also exist in a networked relationship to other themes, connected by content and level (Attride-Stirling, 2001). Code and theme development is an immersion process, and effective thematic analysis should at least partially allow themes to emerge which are "grounded in the data, and not given a priori" (Lincoln & Guba, 1985). However, qualitative data analysis can also function deductively, drawing on existing theory to examine categories and relationships between categories within data. This analysis sought to strike a balance between approaches by looking for clear themes drawn from the literature, noting their presence and absence, while also identifying relevant new themes as they emerge through the data. Through immersion, this approach allowed the researcher a holistic understanding of the resilience and collective action processes present in the data.

The themes for the analysis were drawn from the CART framework (Pfefferbaum, et al, 2015) and Senecah's (2004) Trinity of Voice theory. The analysis looked for community enactment (in the form of discursive interaction) of the four interrelated domains of community resilience and/or the three voices of access, standing, and influence. Community enactment was evident when themes were evident in the statements of several participants at an individual meeting or when they were made at several meetings. In some cases, statements generated collective responses, such as applause, from members. Identification of these themes within the data required careful context-based coding. It was not sufficient to merely identify a grammar of resilience and participation. The researcher looked for discursive interactions which demonstrated connection and caring, mobilized key resources, engaged in collective sensemaking, and attempted to manage

and mitigate impacts. The availability of information to all participants, as well as the degree to which participants' ideas were heard, discussed, and involved in the public decision-making process was examined closely to determine access, standing, and influence. Although there were no hard rules guiding the analysis, some generalizing statements about themes can be made.

Themes of connection and caring were signaled through statements evoking community identity, shared values, and unifying experiences, and responsibility towards collective well-being and the common good. Utilization of resources was marked by the political mobilization of financial, physical, and social resources, as well as the role of leadership and social capital in the community. The role of collective sensemaking in transforming understanding of the issue and co-constructing meaning around the issue was understood as a theme of transformative potential. Disaster management could be seen in community efforts to manage harmful impacts of the crisis.

The four domains of CART and their manifestation in town meeting themes are presented in Table 4.

Table 4. CART themes identified in PFAS town meetings.

Caring and Connecting
Community identity and commitment towards community well-being
Meetings as location for connection
Connecting with the community through communication
Relationship with the potentially responsible parties (PRPs)
Utilization of Resources
Water as a resource
Distribution of bottled water
Volunteers as resources
Information as a resource
Leadership
Transformative Potential
Michigan's coordinated response (MPART)
Change in PFAS regulations
Information as empowerment
Uncertainty reduction
Community sensemaking
Disaster Management
Monitoring of contamination
Speed of response
Coordination of agencies
Coordination with community

Statements reflecting technical understanding of the issue and its impacts were seen as signaling access. The degree to which a variety of community members could voice differing opinions throughout the meeting without being silenced was seen to indicate standing. Finally, the ability for community members to make policy suggestions which were given evaluation and credibility was seen to indicate influence.

The three voices of effective public participation and their manifestation in town meeting themes are presented in table 5.

Table 5. TOV themes identified in PFAS town meetings.

Access
Opportunities
Potential
Safety
Standing
Civic Legitimacy
Influence
Collective decision-making processes
Reflexive leadership
Political Influence

<center>**Analysis**</center>

CART Themes

Connection and Caring

Community Identity and Commitment toward Community Well-being

Community identity and commitment toward community well-being was a strong and consistent theme across PFAS meetings, including those in Parchment and Cooper Township. In the first community meeting on the issue, Parchment Mayor Robert Britigan III evoked this theme directly by stating, "We are in this together – we all drink the same water." At the Town Hall with Senator Sean McCann on 4/25/19, a spokesperson from MDHHS reflected a caring response when she said the state was following "public health protective response" developing screening levels especially for those most vulnerable (children, pregnant women) "we are making assertive public health decisions" towards the most vulnerable members of the community. At the Rockford PFAS Town Hall of 11/29/17 a liaison with the MDHHS said,

> "We thank all for coming and thanks to all of you who have tried to contact me who have had patience as I try and keep up with the calls. . . You are all very important to us and you all make up our community. This has been a very complex issue. Thank you for taking to time to come and be informed about the issue."

Community identity was constituted in multiple ways which were distinctly different across communities. Cooper township meetings, for example, would begin with a group recitation of the pledge of allegiance. Others began with a welcome for the meeting organizer. Most emphasized a sense of community identity by utilizing the collective we, and references to "our water" and "our community." At one meeting an EPA official called the Parchment community response "extraordinary" with an effective response "in a very short time and the whole community pulled together" (EPA PFAS contamination hearing, 8/5/18). Other communities also recognized

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and applauded local response, "the local community part of this is important" (PFAS town hall, 3/8/19).

Meetings as place for connection

In was evident that the meetings themselves were a location for connection among community members and between community members and representatives of response agencies. As one community participant said, "We appreciate a seat at the table" (EPA PFAS contamination hearing, 8/5/18). In many cases, the organizers of the meetings began by thanking the organization that hosted the gathering, including local high schools and churches and the audience member "Thank you coming. We appreciate the opportunity to be with you." (Rockford PFAS Town Hall, 11/29/17) and "Thank you to Haven Reform Church for hosting us" (Parchment PFAS contamination meeting, 7/31/18). Connection was also evident in the interactions between participants. Participants often sought out others, exchanged contact information and discussed common issues. Agency spokespersons often made personal connections with individuals. The Rockford PFAS Town Hall on September 12, 2017 was emceed by the Director of Communication for the Kent County Health Department. He emphasized that "We are here to share information and answer your questions and we will stay here as long as it takes to answer all your questions."

After the onset of the COVID-19 crisis in early 2020, physical meetings around issues of PFAS ended. Virtual meetings continued to be organized by EGLE, however in practice these meetings were mostly informational recitations by subject matter experts and were often redundant to each other. Attendance at these meetings was low, and community interaction and was very limited. Questions were also much more limited. The social distance requirements imposed by the pandemic significantly hindered rich face-to-face interaction and appeared to significantly reduce community involvement across the board.

Connecting with the community through communication

All meetings included some form of question and answer format to respond to audience questions. The dialectic exchange between audience and typically a subject matter expert involved connecting directly with community members. These Q and A sessions involved either a note card format, where community members submitted hand-written questions, or a microphone format where community members were invited to speak. A dominant theme of the meetings examined was connecting with the community through these communicative exchanges. The town meeting was a primary channel for this connection, but other channels including local organizations (churches, schools, and libraries) as well as social media channels were occasionally mentioned as additional routes of connection.

The director of MPART (the Michigan PFAS Action Response Team) reflected the general tone of meeting leadership when he said, "We are committed to engaging with impacted communities. . . trying to be as transparent as we can… we are doing a good job of engaging with communities" (Town Hall with Senator Sean McCann, 4/25/19). An emphasis on transparency was common from leadership across meetings and communities. The general tone was sharing all available information with citizens. In one case, a member of the community criticized the communication activities of state agencies. "Your warnings (about contaminated game animals) aren't timed well. You could have released these warning sooner. My request is stronger communication." A spokesperson for the MDHHS responded, "We are now developing a communication plan (about warnings)" (Oscoda PFAS Meeting, 5/22/2019).

Connection was also evident in the number of organizations and groups participating in the meetings. Government officials at the local, state, and sometimes federal levels attended the meeting and were often described as the organizers. Agency representatives, most often from departments of public health or environmental quality also spoke. Additional group representatives

were occasionally in attendance, and often identified themselves in the Q and A period. All of these groups were part of a larger community of interest calling attention to the issue of PFAS and pressuring for actions.

These groups, identified in Table 6, included three general categories. First were the local chapters of national environment groups. Local environmental groups were also represented. Finally, emergent groups focusing specifically on local water contamination issues participated. Two established trade association groups, the American Water Works Association and Michigan Manufacturers Association, also participated in some of the meetings.

Table 6. Organizations commenting at PFAS town meetings

Group	Type
Natural Resource Defense Council-Michigan Chapter	National Environmental
American Water Works Association	Trade Association
Wolverine Community Advisory Group	Emergent Water
Sierra Club – Michigan Chapter	National Environmental
Clean Water Action Michigan	National Environmental
Washtenaw 350	Local Environmental
The Ecology Center	Local Environmental
Huron River Water Shed	Local Environmental
Michigan Environmental Council	Local Environmental
Water Keepers	Local Environmental
Scio Residents for Safe Water	Emergent Water
Michigan Environmental Caucus	Local Environmental
Wurtsmith Restoration Advisory Board (RAB)	Emergent Water
Anglers of the AuSable	Local Environmental
Parchment PFAS Concerned Citizen	Emergent Water
Kalamazoo River Water Shed	Local Environmental
Need our Water	Emergent Water
Michigan Manufacturers Association	Trade Association
Michigan Environmental Council	Local Environmental
Concerned Citizens for Responsible Remediation	Emergent Water
Michigan Demands Action Against Contamination	Emergent Water
Trout Unlimited (various chapters)	Local Environmental

Relationship with the potentially responsible parties (PRPs)

The relationship with the potentially responsible parties (PRPs) including the U.S. Air Force, 3M corporation, Georgia Pacific, and Wolverine Worldwide was a common theme across several meetings. Leadership generally encouraged a cooperative relationship with the PRPs, while community members showed primarily neutral attitudes towards these parties with a few indicating blame and anger (Town Hall with Senator Sean McCann, 4/25/19; PFAS Lawsuit Update, 11/20/19). The Senior Vice President for Wolverine World Wide, a company associated with PFAS contamination, spoke at the Rockford Town Hall Meeting on September 14, 2017 about the contamination and the company's commitment.

> We were founded in Rockford in 1883. We are proud to call west Michigan our home... we are part of this community... we have worked with DEQ. We have been a part of this community for a long time, and we plan on continuing to be part of this community. I want to assure you of our commitment to this process and to ensure that homeowners have confidence in their water. Our commitment is to you now and in the future.

Accusation of blame and responsibility were reflected in many of the comments from citizens, especially in the case of Georgia-Pacific and their Crown Vantage facility in Parchment. A great deal of attention would continue to be paid to the role of the Crown Vantage paper mill as the source of the contamination. Plans for the abandoned mill were brought up by community members in the question and answer period of each meeting, and for two of the meetings the mill was a major topic of focus for community leadership (PFAS Lawsuit Update, 11/20/19; Crown Vantage Update Meeting, 4/9/19).

Sources of contamination were also discussed at other meetings across the state. Meetings focusing on contamination in Oscoda, Michigan were traced to the abandoned Wurtsmith U.S. Air Force base. Several participants in these meetings became critical of the Air Force and Department of Defense's response. As one official summarized, "we are in a dispute with the Air Force about

the pace of the clean-up at the base" (Oscoda PFAS Meeting, 06/27/18). When discussing testing during a question and answer session, another resident remarked "For us to trust data from an entity that has been lying and hiding this for years – I distrust the consultants hired by the Air Force" (Oscoda PFAS Meeting, 06/27/18). The absence of the Department of Defense from one town meeting was noted by the Director of MPART, "We are sad that DOD cannot be here with us today. We would welcome their participation in a meeting like this" (EPA PFAS contamination hearing, 8/5/18).

Utilization of resources

Water as a Resource

One of the most important aspects of the theme of water as a resource was the immediate connection of the Parchment Municipal Water system to the Kalamazoo Water system. This connection occurred within a matter of days after the contamination was identified and quickly allowed safe water to be distributed to Parchment residents. The initial connection between the two systems involved the use of fire trucks as water pumps. These were later replaced with standard water equipment as the connection was made permanent. Residents were also advised to flush their systems so that all PFAS contaminated water was removed (Parchment PFAS Contamination Meeting, 7/31/18).

At other meetings later in the development of the issue, politicians focused on the "Identification of resources, state and federal, to replace water systems" (Wurtsmith Contamination Town Hall Update, 2018/06/27). Additional discussion of resources for clean-up important as communities such as Parchment began looking past the immediate problem of access to safe water.

The importance of water systems and bodies of water was also discussed at several meetings. This included rivers, lakes, creeks, and streams that were notable landmarks in the area. Attention was directed toward protecting these water systems so that they could be used as resources for the community. At multiple meetings in Parchment concern was raised about the impact on the Kalamazoo River. For example, "as a conservationist and someone who spent 65 days on the river this year, I [have] concerns" (PFAS lawsuit update, 11/20/19). Other meetings focused on other relevant bodies of water. The Washtenaw County PFAS meeting on December 18, 2018 focused on the impact on the Huron River. The issue of fish consumption advisories was discussed at several meetings. A toxicologist with MDHHS discussed the issue of swimming in contaminated water and concerns about PFAS contaminated foam that can form on water. "PFAS doesn't move through your skin, but don't eat the foam" (Wurtsmith Contamination Town Hall Update, 06/27/18). A similar statement was made by a state toxicologist at the EPA PFAS contamination hearing on October 5, 2018 along with a recommendation to "Keep your pets out of foam."

Some community participants in the question and answer period discussed their frustrations with fish advisories and related limitations on using water resources. One resident said, "I go fishing every day and now you are telling me I can't eat this fish?" (Washtenaw County PFAS Meeting, 12/18/18). One toxicologist spoke specifically about the safety of home grown fruits and vegetables: The only place we have told people not to eat their home grown food is in Parchment, where we had very high levels of contamination" (Washtenaw County PFAS Meeting, 12/18/18). At other meetings, issues of consuming wild game from PFAS contaminated areas were discussed (Oscoda PFAS Meeting, 05/22/19). In some isolated cases residents pushed back against the warnings, suggesting that they were overstated. "Is there scientific certainty that PFAS causes

adverse health outcome or just theory? You (MDHHS spokespersons) are creating perceptions that the lakes are toxic" (Oscoda PFAS Meeting, 05/22/19). Others expressed concerns that the communication was not clear, too technical, not giving specific guidance and that media reports were scaring people. An MDHHS participant responded "We are trying hard to translate this information so that you can use it to make decisions. That's our job and we can't control the media" (Oscoda PFAS Meeting, 05/22/19).

Distribution of bottled water and Filters

Resource reallocation was a major theme and concern of the initial meetings in Parchment and Cooper Township, particularly in the Parchment PFAS contamination meeting on July 31, 2018. Bottle water shipments initially intended for state-wide distribution were re-routed towards Parchment, and emergency water distribution sites were established throughout the community. In the initial stages of the crisis, volunteer labor was important to facilitating a rapid response. The speed with which bottled water was distributed and the city of Parchment water was connected to the Kalamazoo system was touted as a heroic effort at the initial Haven Church meeting. These efforts were applauded at meetings, and representatives described these efforts as positive community responses to the contamination.

Volunteer labor as a key Resource

Community structures in the form of local churches and the Parchment High School rose to meet several needs. They provided the labor necessary for distribution of bottled water and hosted meetings. In the Parchment PFAS contamination meeting on July 31, 2018, this response from the community was celebrated explicitly as an example of community resilience. The Parchment City Sheriff remarked:

The servant leaders in your community – your kids – unloaded those (bottled water) trailers. This community is not a victim in this situation. You guys have shown a resiliency in your community that is not willing to be victimized. I've never been prouder to be a member of this community.

This comment elicited cheers and applause from the audience members. The high school football team had been organized very early in the crisis and the community celebrated their role and the 'Parchment Panthers' as heroes.

Volunteer labor would continue to be an important resource throughout the crisis, and the capacity of communities to meet this resource need was highlighted at subsequent meetings. "We had people knocking on doors to make sure people had bottled water" (EPA PFAS contamination hearing, 8/5/18). The availability of spaces such as the high school and local churches for meetings and distribution sites for water and filters, as well as the networked capacities of local organizations including the salvation army, the boy scouts, and the high school athletics teams were often mentioned. The theme of the community coming together with state agencies to address the problem was evoked in most of the meetings.

Information as a Resource

Informational needs were clearly articulated by community members across many meetings and information was a primary resource used to address the PFAS contamination problem. Statistical and technical information was reiterated several times within and across multiple town meetings, particularly information related to place, testing, and sampling, as well as health effects. As one participant from an agency noted, "You want to know if this stuff is in your water and you want to know the health effects" (Rockford PFAS Town Hall, 9/12/17). Technical information was presented by subject matter experts who frequently noted that they were trying to present information in understandable language. In multiple instances, community members noted

that the information was at too high a level. A state epidemiologist responded that she was still learning how to present information in more understandable ways (Oscoda PFAS Meeting, May 22, 2019). In other cases, community members expressed confusion and frustration about the high levels of uncertainly and lack of clear answers. Subject matter experts were often asked to clarify their remarks or respond to seemingly contradictory statements.

Testing, sampling procedures and the location of sampling wells were dominant topics supporting the theme of information as a resource. This included highly technical descriptions of decisions for sighting the wells, their distribution, and procedures for testing the water. Maps of testing well sites were presented at multiple meetings showing the location of contamination in relation to water sources and industrial sites. These maps were used in every meeting addressing issues in Parchment and Cooper Township. Maps of contamination plumes were also shared at several meetings. Testing was described in detail by agency representatives as part of ongoing investigations. Interestingly, in both cases, the companies associated with the contamination agreed to participate in the investigations. The financial burden of testing was also a focus of these conversations. At one meeting in Parchment a representative of the EPA explained, "It's $700 to have one child tested and you've got some low-income families that have been impacted" (EPA PFAS contamination hearing, 8/5/18).

The behavioral guidelines necessary to secure clean water samples were described as a way to illustrate the complexity of the problem. PFAS is such a common chemical that even residue on someone's hands can contaminate a water sample. "No fast food consumption for fourteen hours and no cosmetics" (Rockford PFAS Town Hall, 11/29/17). Locations of labs and limited availability of labs that can test for PFAS were also described at length across multiple meetings. At the Washtenaw County PFAS meeting on December 18, 2018, a spokesperson for the DEQ

sought to illustrate the 70 parts per trillion (ppt) safety guideline with the example "1 ppt = 1 drop in 20 Olympic swimming pools."

Almost all of the meetings included subject matter experts. In most cases, these included state level toxicologists, epidemiologists, biologists, hydrologists, water resource experts, water treatment experts, and physicians among others. As a primary organizer of meetings across the state, EGLE would often provide representatives to serve as subject matter experts. When meetings were organized locally, subject matter experts were more likely to come from local health departments. In all of the meetings, local representatives were included.

Community and Political Leadership

As described earlier, most of the town meetings featured representatives of state agencies and these spokespersons often began their remarks by emphasizing that Michigan was a national leader in addressing issues of PFAS contamination. This included the effort to test all 1700 municipal water systems throughout the state and the creation of MPART. At one of the early PFAS meetings in Parchment a state environmental official stated, "We learned a lot from Flint (the Flint Water crisis)" (Parchment PFAS contamination meeting, 7/31/18). At the EPA PFAS contamination hearing on October 5, 2018, Congressman Fred Upton noted that legislation about community notification had been changed after the Flint Water Crisis, "Whenever EPA is aware of a situation like this, or Flint, they (now) have to communicate with the public within 24 hours." The theme of effective local leadership was reflected in an additional comment by an EPA official. "We visited with the mayor of Parchment and we heard about the extraordinary work that you personally along with the state and members of the community in Parchment and the county more broadly did to address the challenged you faced in an extraordinary way and a very short time" (EPA PFAS contamination hearing, 8/5/18).

Leadership demonstrated some reflexive capacity towards the community. Time was given at the end of each meeting for community members to ask questions directly of officials, and these questions were generally proactive and information seeking. These questions and answers were also an effort to seek direct accountability and commitment for those in designated authority positions. Risks associated with particular behaviors, potential health impacts, plans for additional testing, and emergent personal and community financial burdens were all widely discussed across all of the meetings in the Parchment area and at other locations. Consumption of fish and game, use of water for gardening, swimming in lakes and rivers, impact on property values and tourism, timing for testing and connecting to alternative water systems were common.

Some environment group representatives emerged as leaders in the meetings. Specifically, the director of the Huron River Watershed took a leadership role in both the December 18, 2018 Washtenaw County PFAS meeting and the Oct 9, 2018 EPA PFAS contamination hearing. The October meeting, while hosted by city government, was organized by the director at the request of a city manager. EGLE was a primary organizer of many meetings across the state. These meetings continue to occur with regularity whenever a new potential contamination site is identified, up to the time of this analysis in May, 2021.

In other cases, existing community leaders occupied leadership roles within the meetings. In Parchment the seven members of the City Board of Commissioners often took leadership roles in meetings, as did local pastors and community group leaders. In Cooper Township, the Township Supervisor usually assumed a leadership role. Key figures in the Kalamazoo County Health and Community Services Department also commonly assumed leadership roles, acting both as subject matter experts and facilitating conversation with other experts. Michigan state senators Margot O'Brien and Sean McCann, both elected representatives of the area, attended meetings and

assumed leadership roles in guiding discussion (Cooper Township water contamination meeting, 9/10/18: Town Hall with Senator Sean McCann, 4/25/19). The Michigan State Lieutenant Governor and U.S. Congresswoman Debbie Dingell attended meetings in Parchment. State Representatives Cherry, Neeley, Kennedy, and Sneller attended meetings in Genesee County (PFAS town hall, 3/8/19). In each case, the involvement of the external leadership was recognized and celebrated by other local. At the Cooper Township Meeting on September 10, 2018, Town Supervisor Jeff Sorensen thanked Senator O'Brien for her leadership:

> "She was there at 5:30 in the morning out with the rest of us, and she was there every single day at the water distribution site. I would like to thank her very much for her efforts… it is an election year for her but Parchment and Cooper is a very small area of her district, so I thank you for giving your time to us we appreciate it very much."

Michigan Congresswoman Debbie Dingell introduced the Washtenaw County PFAS meeting on December 18, 2018, and said, "We have to make a lot of noise. We have to organize at the grass roots levels… legislators are managing to gut environmental regulations." "I'm going to introduce legislation . . . to require the EPA to set a (PFAS) standard." She presented herself as working with the community and leading an aggressive legislative fight in opposition to those who wanted to weaken environmental regulation. Political leaders were very visible and active in most of the meetings and presented themselves as working to resolve the problem by organizing governmental efforts and in some cases, seeking financial resources to help.

Transformative potential

Michigan's Coordinated response (MPART)

At several meetings, a dominant theme was the transformative role regarding PFAS contamination that the State of Michigan was taking. Leaders emphasized that the state was taking

the contamination issues very seriously and was a national leader in addressing this emergent contaminate. "Michigan has taken one of the most aggressive approaches in terms of really trying to understand this issue and is to be commended for that" (EPA PFAS contamination hearing, 8/5/18). The creation of MPART on November 13, 2017 was discussed by a representative of the Michigan DEQ at the Washtenaw County PFAS Meeting on December 18, 2018.

> We have state level and local units of government talking about this issue and that was a big part of MPART. Building this cooperation and coordination across all levels of response. A big part [of] MPART was to build the organizational structure across all units of government to create a cohesive response.

MPART was touted at many of the meetings as an innovative governmental organization, a repository of information and a method of coordination dedicated to keeping the public engaged and helping communities develop a response. Representatives from MPART were present at a majority of the meetings and in some cases, lead the meetings.

Information and empowerment

A second transformative theme involved the use of information to inform and empower the affected communities. Statements for agency spokesperson such as "We are committed to being transparent," "We want to keep you informed," "We will give you best and most current information we have," "We are here to update you on the PFAS situation" were made frequently and were used to frame the purpose of many of the meetings. A local health department spokesperson introduced the Oscoda PFAS Meeting on May 22, 2019, by noting, "I think sharing information is a vital part of the journey with PFAS."

The primary areas of uncertainty within the theme of information as empowerment included the health effects of PFAS and the extent and level of contamination. Residents were encouraged to sign up for health monitoring studies, to participate in water testing and to use the

results to inform their decisions about using filters or bottled water. The initial meetings in Parchment and Cooper township focused on communicating the procedures for distribution of bottled water and water filters (Parchment PFAS contamination meeting, 7/31/18; Cooper Township water contamination meeting, 9/10/18). Other meetings included information and guidance about consuming fish and game, swimming in lakes and rivers, and avoiding contact with foam (EPA PFAS contamination hearing, 8/5/18; PFAS town hall, 3/8/19; Oscoda PFAS Meeting, 5/22/19; Gogebic-Iron County Airport, 4/6/21).

Collective Sensemaking

Just as these town meetings were sites for connection, they also served as sites for collective sensemaking where the community could hear and process a common message. Collective sensemaking and sharing a sense of grief and loss was another common theme across meetings. Community members often took advantage of question and answer periods to share narratives of grief, uncertainty, and fear, and source support. Personal stories related to health were usually contextualized specifically in a particular time and a specific location, connecting to themes of time and place. Often personal narratives would evoke familial history of health problems, recontextualized in the understanding of long-term PFAS issues in the community. One participant relayed that her family had lived on the Air Force base in Oscoda. "My brother was exposed to PFAS in the womb and as a result he was born with Microcephaly and cerebral palsy" (Oscoda PFAS Meeting, 5/22/19). In other cases, participants referenced a variety of diseases and conditions including cancers and auto-immune diseases and asked, "Did the bad water cause this?" There was a general sense reflected in the meetings that community members were using the information to try and make sense of the contamination to know what to do. One Parchment resident noted "These meeting say how little they know about PFAS and they downplay the health

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effects. I'm not drinking the water. I'm on bottled water – this has opened a whole world of information that I think residents should educate themselves on" (EPA PFAS contamination hearing, 8/5/18).

Changes in PFAS regulation

One of the most dominant and important transformative themes involved changes in PFAS regulations, including efforts to change the maximum lifetime allowable guideline levels for 70 ppt to an enforceable standard. This was described in several meetings. At the Rockford PFAS Town Hall on September 12, 2017, a representative spoke about efforts to set a state level of contamination. At a Washtenaw County PFAS meeting on December 18, 2018, it was noted that the current federal guidelines are not enforceable for drinking water, but there are standards for ground water and surface water. One resident stated the obvious "That doesn't make any sense." Several elected representatives who spoke at PFAS meetings committed to supporting legislation to create stronger enforcement, including State Senator Sean McMann and U.S. Congresswoman Debbie Dingell.

Legal action against PRPs was also a major focus of these discussions, including actions against the organization sees as responsible for the contamination. Implementation of some transformative policies required cooperation from PRPs, while others were dependent on settlement money from PRPs to implement. In Parchment and Cooper, legal action was taken against Georgia-Pacific to fund the connection of the Parchment water system to the Kalamazoo system. On October 26, 2020 a settlement was reached with the City of Kalamazoo Georgia-Pacific, and 3M to provide $5.4 million toward the connection. The city was forced to pay the remaining $2.7 million of the total. A class action lawsuit by residents would be settled in July of 2012. The $11.9 million settlement was for "damages for property damage or diminished property

value, stigma damages, interference with use and enjoyment of property, noneconomic damages, exposure to PFAS and medical monitoring" (Deveraux, Apr 30, 2021).

Disaster management

Coordination of Agencies

The dominant disaster management theme was coordination of response efforts and agencies. This was signaled both in messages and by presenters. In many of the meetings, the emcee was an elected political figure. In the initial meeting, the State Lieutenant Governor called the meeting to order (Parchment PFAS contamination Meeting, 7/31/19) and in another, Sean McCann, the state senator representing Parchment organized and emceed the meeting (Town Hall with Senator Sean McCann, 4/25/19). MPART was often referenced as the "MPART is the most unique organization in the country to address this" (EPA PFAS contamination hearing, 10/5/18). Most of the meetings examined featured elected politicians including mayors, county supervisors, board members and members of congress as well as agency representatives from local, state and federal levels. This demonstrated high levels of coordination between agencies.

Meetings were generally structured as panel presentations where political leaders introduced agency representatives and, in some cases, independent experts who then provided technical information. Representatives from the Michigan Department of Health and Human Services, The Michigan Department of Environment, Great Lakes and Energy, and representatives of the Michigan PFAS Action Response Team (MPART) all served roles in meetings. MPART was established in 2017 as a coordinating body to manage and coordinate state resources and to serve as a clearing house for PFAS information (MPART) The Rockford Town Hall Meeting on November 29, 2017 was emceed by the director of MPART. As one participant remarked, "We

need agencies to partner in good faith because agencies in court don't partner" (EPA PFAS contamination hearing, 8/5/18). One meeting convened by the EPA was a round table discussion that included "20 individuals representing a range of perspectives to drawn in the full breadth of concerns and topics" (EPA PFAS contamination hearing, 8/5/18).

Issue management and risk mitigation

In the initial July 31 Parchment PFAS contamination meeting, attention was given towards managing the issue of risk and the mitigation of risk. An issue is an "unsettled matter that is ready for a decision" (Chase, 1984, p. 38). Decisions about ensuring access to clean water helped manage and mitigate the immediate issue of access to clean water in the short term.   Water distribution sites were established, and plans were announced for the flushing of service lines and the transfer of the Parchment city water system to the Kalamazoo water system (Parchment PFAS Contamination Meeting, 7/31/18). Management of water distribution, flushing and filter use would be a less prominent theme in subsequent meetings as focus shifted towards informational needs, health monitoring and longer-term risk management, with some exceptions. New approaches for issues management and risk mitigation would be discussed occasionally, such as fish and wild game consumption advisories and avoiding PFAS foam (Town Hall with Senator Sean McCann, 4/25/19; Oscoda PFAS Meeting, 5/22/19). The presence of foam, associated with PFAS contamination, made the issue more immediate, according the one town meeting comment. "We all knew it (PFAS) was there but it really sunk in when the foam starts forming on our water –we now see big piles of it on the shoreline, we can see this. People are now saying "Oh my god, this is serious. What are we going to do about it?" (EPA PFAS contamination hearing, 8/5/18).

Monitoring of Contamination

As noted earlier, information was treated in the meetings as a resource and to acquire information elaborate system of monitoring wells and testing of ground and surface water were established. One persistent theme involved technical information about the methods of testing and results. At the Washtenaw County PFAS meeting on December 18, 2018, an elaborate program of testing surface water was described to try and determine sources of contamination so that they could be controlled. Similar procedures were described for all the major sites of contamination. Many of these discussions included highly technical information, including detailed hydrological maps with the locations of monitoring wells.

These testing plans described the monitoring of wells, location, timing, testing procedures, results, and interpretation of results. This included PFAS levels that were at levels of no detect, detected at levels under 70 ppt, and those above the level of 70 ppt. In fact, the initial discovery of PFAS contamination in several sites was a consequence program of monitoring issued by the state. As a representative of EGLE mentioned at the Town Hall with Senator Sean McCann on April 25, 2019, "Last year we tested all 1700 municipal water systems in Michigan (May through December). That's how we discovered Parchment contamination."

In summary, the analysis of town meetings revealed a variety of recurring statements that fit within a set of larger themes. These themes support the four resilience features in the CART framework: connection and caring, identification of resources, transformative potential, and capacity for disaster management. The process of participation the meetings is examined next using the trinity of voice framework.

TOV Themes

Access

Access was a consistent theme across meetings, although the degree of access varied widely. Meetings were open, public meetings where residents could have face-to-face conversations with subject matter experts and politicians. In multiple meetings the PRP polluter was present, and in a few cases representatives of the PRP was given an opportunity to speak (Rockford, Parchment). Community members were given opportunities to speak during and after meetings, although the degree of access granted through these opportunities was inconsistent. "We are still without a structure for community involvement . . . people are interested but they feel disenfranchised" (EPA PFAS contamination hearing, 8/5/18).

Opportunities

Access was secured in most meetings through structural meeting choices. Meetings were held in centrally located areas of the target community and were most often held in the evening, when the conventional 9-5 workday would be over. This structure necessarily restricts access to younger and less wealthy majority of community members. Families with children and people who work in the evenings are unable to attend these meetings. General meetings in Parchment and Cooper Township were well attended, however participants regularly made note of the lack of turnout from the broader community.

An additional component of access concerns information that is presented in an accessible and understandable form. Major focus was placed on the communication of highly technical information in ways that community members could understand. Community members often indicated confusion and the lack of understanding was a common theme across many meetings.

Several meetings included statements such as "it's hard to wrap your head around," "we simply don't know," and "there is a high level of uncertainty about what the health effect are and could be. We just don't know." (Rockford PFAS Town Hall, 9/12/17). "This is a confusing issue" (Oscoda PFAS Meeting, 5/22/19). "The science is over our head – I need to know if I can eat fish?" (Wurtsmith Contamination Town Hall Update, 6/27/18). At one meeting where a member of the audience complained that the information presented was too technical, a spokesperson from MDHHS responded "Yes, I know and we constantly hear from our health educators that we need to do better" (Oscoda PFAS Meeting, 9/22/19). Access to information was not restricted to the official meetings, subject matter experts often carried on conversations after the meeting was over. "I'm going to adjourn our meeting and if anyone has any questions the health officials are here and the engineers are [as well] ... please feel free to ask questions, but we're now adjourned" (Cooper Township Water Contamination Meeting, 9/10/18).

The easy availability of records of meetings also serves to help facilitate access. Community members are able to revisit recordings of previous meetings, review talking points and use this information to contextualize their engagement with these issues. The availability of these records broadens access to community members who ordinarily would have no access to these meetings, such as those who work long hours, community members in prison, and house-bound community members. This access, as well as access to virtual meetings that were held during the COVID-19 crisis, necessarily requires some level of digital literacy, access to technology, and reliable internet.

Potential

At the majority of meetings structural choices created potential for each community member to be heard. The timing and location of meetings, the use of Q & A sessions, and the

availability of leaders for conversations following the meeting helped to encourage participation. However, some barriers to participation did exist. In a significant number of meetings participants were asked to identify themselves when they spoke, and no avenues for anonymous critique or questioning (such as a notecard question format) were available. In cases where community actors also control a variety of other local policies, an absence of anonymous channels can create barriers to participation. Meetings in Parchment and Cooper Township generally employed a hybrid question approach, allowing opportunities for face-to-face questioning and anonymous questioning.

Many meetings across the state were held at churches and evoked Christian values, which created boundaries for practitioners of other faiths. All meetings examined were presented solely in English despite 10% of the state population speaking a language other than English at home (U.S. Census data, 2020). No meetings examined made use of an American Sign Language translator. These barriers are less significant in Parchment and Cooper township due to the cultural homogeneity of the community, however there are Jewish, Muslim, and non-English speaking minorities within the community (U.S. Census data, 2020).

Safety

Access was reduced considerably with the onset of the COVID-19 crisis, as meetings transitioned toward virtual delivery. No new meetings around the issues of PFAS contamination have taken place in the community of Parchment and Cooper Township since the PFAS Lawsuit Update on November 20, 2019. Cooper Township continues to hold regular virtual town meetings to discuss local ordinance, but Township leadership has indicated in social media posts that they see little to no attendance of these virtual meetings in comparison to previous in-person meetings.

The researcher attended some of these meetings but PFAS was not discussed, and these meetings were not selected for analysis.

Although the majority of feedback from the community was positive, community members demonstrated relative comfort in pushing back against leadership. Critiques of community leadership were common, particular of Cooper Township leadership. This pushback occurred regardless of question format or meeting location. Comments usually focused on a disconnect between the interests of leadership and the interests of the community, as well as questioning the relationship between leadership and PRPs. One Cooper township resident commented:

> Some of our elected officials have decided to give authority to corporate polluters on how to police themselves, rather than to have oversight from independent agencies. Handing out water is a small consolation after you have decided to give authority to corporate polluters (EPA PFAS contamination hearing, 8/5/18).

Standing

Civic Legitimacy

Legitimacy of spokesperson participants primarily came from political and expert authority. Community members without official government roles however were afforded opportunities to participate in every meeting examined. Authority for participation stemmed from community membership.

Participants often identified their residence, length of time living in the community, "I've lived in Parchment my whole life and let's just say now, I'm retired" (Parchment PFAS contamination meeting, 7/31/18) "I live in a cabin that's been in the family for 50 years" (Oscoda PFAS Meeting, 5/22/19). "My brother was exposed to PFAS in the womb and as a result he was born with Microcephaly and cerebral palsy." My family wrote a book about our journey and included the poison" (Oscoda PFAS Meeting, 5/22/19). When the researcher attended events he

was asked to identify residence, and his legitimacy was challenged when he identified as living outside of the area. Residents indicated surprise and laughed at the idea of a person from Indiana traveling to attend the meeting.

In Parchment and Cooper Township, familial identity and connected to the Paper Mill were often evoked. "I represent the [family name] clan. we've lived in Parchment all our lives. Karl used to work for the paper mill, Glen his older brother also worked for the paper mill Parchment, and my grandfather Clarence." (Crown Vantage Update Meeting, 4/9/19). In many cases, speakers were representing other groups as noted in Table 6. These included environmental groups, and emerging community water groups who established their legitimacy by identifying with the issue of PFAS contamination.

Community members often took it upon themselves to speak to the crowd after the meeting had officially adjourned, and community leaders and subject matter experts would usually remain to participate in discussions. Post-meeting discourse usually centered on personal issues, as well as pushback against policies discussed in meetings. In one conversation following the Crown Vantage Update Meeting on April 9, 2019, community members that were quiet during the official meeting pushed back against plans to connect to city water.

> "I live on the corner of Citadel Street and Wolverine… we haven't been tested yet for our well water. Basically, we're being told a bunch of things on social media… we're going to be forced [to connect to city water] even though we don't want it. So final answer, if you have the answer, do we have to? Period, the end. Or can we say no we don't want it; we don't need it?"

Influence

Collective decision-making processes

Collective decision-making was a dominant theme across many meetings, as was particularly prominent in Parchment and Cooper Township. Many meetings were organized with

the express purpose of guiding collective community action (PFAS Lawsuit update, 11/20/19) while others were organized to elicit community input on policy questions (Crown Vantage Update Meeting, 4/9/19). While it is not possible to trace a direct causal link between community discussion of policy and policy implementation, a clear and open space for discourse around decision making was provided to the community.

In general, participants did not express frustration or disappointment with the town meetings, with two notable exceptions. At the EPA PFAS contamination hearing on October 5, 2018, (described by organizers as a round table with the community) two separate residents of Parchment critiqued the meetings. A leader of an activist group asked for more community involvement.

> "People need to know. We are essentially the guinea pigs drinking these chemicals. We have asked to from day one? have a seat at the table – to have a community action panel set up so we can express our frustrations. These meetings are great but when you have only two minutes to express frustrations it really doesn't give you ample time. What we are asking for is a seat at the table."

A second resident of Parchment offered an assessment that the communication was inadequate. "With all due respect, we have had one meeting in Parchment we have had one town hall meeting. . .. There was communication first and then there wasn't" (EPA PFAS contamination hearing, 8/5/18). Both comments reflected a desire for a community drive process where "We can invite the DEQ and the Health department (to meetings) rather than have them hold town hall meetings" (EPA PFAS contamination hearing, 8/5/18).

Reflexive leadership

Leadership in Parchment and Cooper Township demonstrated reflexive listening across several meetings. In the Crown Vantage Update Meeting on April 9, 2019, the Township Supervisor remarked:

"I invite anybody anytime to call me on my cell phone and come by my house… go to my office, whatever. If you have some doubts or concerns please talk to us, come in to talk to us, come to a meeting, whatever, we're accessible- that's the beauty of Township government."

A capacity for reflexive leadership was demonstrated in other communities as well, including invitations for private conversations. "If you don't have our contact information feel free to ask, we're happy to give it to you" (Oscoda PFAS Meeting, 5/22/19). At the PFAS town hall on May 8, 2019, leaders made a concerted effort to answer every question asked of them "if you have any questions that we can't answer tonight we'll compile them all [to answer later]". At multiple meetings leaders directly apologized to audience members for not having information, not being able to resolve issues, or not being able to provide direct answers to questions (Rockford PFAS Town Hall, 9/12/17; Milford PFAS Meeting, 8/4/18; Oscoda PFAS Meeting, 5/22/19).

Political Influence

Community members showed willingness and interest in engaging in cross-community advocacy involving community groups, as well as local, state and federal political authorities. Meeting participants often framed their experiences in terms of other Michigan communities experiencing similar issues and used social narratives of political struggles to frame their next steps. The Water Crisis in Flint, Michigan was evoked at numerous meetings, and the PFAS issues in Oscoda, Parchment, and Rockford were discussed across the state (Parchment PFAS contamination meeting, 7/31/18; Milford PFAS Meeting, 8/4/18; EPA PFAS contamination hearing, 8/5/18). At the PFAS town hall on May 8, 2019, cases in Missouri and West Virginia were used along with more local cases to frame discussion of new policy.

As discussed earlier, many meetings were a space for collective decision-making around advocacy, management of the issue of PFAS contamination and policy decisions. In some cases,

meetings were used to test reactions to policy proposals and behavioral strategies (Crown Vantage Update Meeting, 4/9/19; Town Hall with Senator Sean McCann, 4/25/19; Oscoda PFAS Meeting, 5/22/19). In other cases, the question and answer period was used either to advocate for polices or to push back against in-place policies, affording a dialogue around the rational for those policies. "How are you going to redefine the advisory this year based off of one deer [that tested high in PFAS]?" "Can we say no [to being connected to city water]?" "Can you force the people that owned the mill... the land around it, to shut it down completely? like knock the building down... or what can be done about it?"

Despite many issues being discussed in depth at meetings, it was uncommon to subject these issues to a vote nor to any other mechanism of direct democracy. At Cooper township meetings policies and resolutions were occasionally voted upon, but specific policies related to PFAS were never decided through vote. No other meeting made any effort to use mechanisms of direct democracy to decide specific policy issues, save for providing a space for discourse.

Interpretation and Discussion

The town meetings conducted in Michigan communities contaminated with PFAS/PFOA chemicals were part of a strategy of engagement designed to both provide information to affected communities and to give voice to community concerns. The meetings were primarily organized and hosted by politicians and response agencies. The themes from these meetings provide insight into how the communities made sense of and organized in response to the contamination and how they employed strategies of resilience and collective action.

Research question one asked, how has the community of Parchment, MI and Cooper Township enacted resilience toward the issues of PFAS contamination? The themes evident in these town meetings demonstrated all four of the resilience features identified in the CART

framework, including connection and caring, identification of resources, transformative potential, and capacity for disaster management, although at varying levels. In evaluating research question one based solely on the CART framework, the community's enaction of resilience was generally successful but undercut by barriers in connecting with diverse community members, limits in information resources, and a lack of community voices represented in transformation efforts.

The communities of Parchment and Cooper Township demonstrated high levels of caring, especially at early stages of the contamination event. Caring and connection, at least as evident in the town meetings, dropped off over time especially after the advent of COVID-19.

The initial town meetings included themes of community identity and well-being. The celebration of volunteers / heroes and the speed of response illustrated a community that was concerned about both collective and individual well-being. Care was evident is statements acknowledging the legitimacy of health anxiety and concerns, and commitments to do everything possible to protect the most vulnerable. The decision to test all municipal water systems in the state also reflected an awareness of the vulnerability of communities to contaminated water. This heightened awareness, as was suggested in one meeting, may have been a consequence of the Flint Water Crisis, which occurred two years before the discovery of the Parchment contamination. The Flint Water Crisis demonstrated how badly communities and individuals could be harmed by contaminated water.

Caring was also evident in the level and form of connection and coordination. State agencies, including the Michigan Department of Health and Human Service, the Department of Environmental Quality which became Environment, Great Lakes and Energy, and the agency that emerged from the contamination event; Michigan PFAS Response Team. Town meetings were also important as locations for connection and as symbols of connection. The willingness of agency

spokespersons to try and answer all the questions from participants demonstrated a commitment to the community and commitment was explicitly stated on several occasions. The repeated appearance of agency representatives at face -to -face meetings demonstrated a sense of connection and engagement. Themes of connection and caring were also reflected by statements of empathy such as "we live in the community and we drink the same water."

The manifestation of caring appeared to dissipate over time. This may be a function of general fatigue in dealing with the contamination and the absence of new information. It may also be that the risks of COVID-19 replaced concern of PFAS contamination. At the Oscoda PFAS Meeting on May 22, 2019, a community member specifically noted that the community needed to be more engaged. "We need more people to care about this and more people to show up."

The theme of relationships with those parties principally responsible for the contamination was complex. In the case of Wolverine World Wide, caring and engagement were manifest in public appearances of company executives and statements of commitments to the community. In the cases of the U.S. Air Force and Georgia-Pacific, themes reflected distrust and anger at organizations that had contaminated the water and then left the community to deal with the consequences. Parchment's relationship with the industry that gave the city its name and eventually its legacy of contamination illustrated a complex relationship between industries and communities. While communities and companies are connected, the relationship is not always characterized by compassion and care.

CART also attributes community resilience to the utilization of resources and themes from the town meetings indicate what specific resources were used and in what ways. Parchment was able to quickly replace the critical resource of water. Distribution of bottled water, filters and connections to the water systems of adjoining communities occurred quickly and efficiently in part

due to the presence of another resource in the form of community volunteers. Volunteers were primarily drawn from community organizations, including churches, schools and community groups. In a manner expected to occur in emergent organizing in response to a crisis, these organizations provided resources and support to address emerging and unmet crisis-related needs.

The resource theme that dominated town meetings involved information. Many of the meetings were structured as information sessions whereby plans, procedures, data, and the current state of science regarding PFAS contamination was disseminated to the communities. Subject matter experts, communication professionals and health educators sought to translate highly technical information into a form that the audience could understand. Maps, power point slides, flyers and questions and answer sessions were featured in almost all the meetings.

The theme of information as a resource was supported by several principles. Information was a point of engagement, as necessary for informing individual decision making and as a way of addressing uncertainty and concern. By providing information, meetings served the purpose of engagement. Many residents sought answers to specific questions about health effects, impact on wildlife and what would happen next so that they could make decisions. Technical information was used generally to reduce uncertainty and help residents collectively make sense of what was happening.

Transformative potential, the third marker of resilience in the CART framework, was reflected in many themes from the meetings. The PFAS contamination event transformed how the state understood water contamination and responded to these events. The development of MPART created a new model for response that transformed an often very slow and bureaucratic approach to environmental issues. Transparent and timely information communicated to the public was also

transformative in that it empowered community members to make decisions and take actions. These actions included efforts to organize around changes in PFAS regulation.

Change in PFAS regulation was a major theme in many of the town meetings. The U.S. EPA's PFAS lifetime guidelines of 70 ppt were described as inadequate, unenforceable and too high. Community members from Parchment as well as those from other major contamination sites in Oscoda and Rockford sounded common themes that the limits needed to be changed and the response to PFAS contamination needed to be transformed. In several cases, participants expressed frustration that limits had not been changed and that transformation in the regulation of PFAS was far too slow.

The final element of the CART framework involved disaster management and this too was evident in many themes from the town meetings. The speed of the initial response and the involvement of volunteers, as described earlier, was celebrated as a disaster response success. The coordination of response agencies and community groups was also a theme of success in the response to the contamination. In particular. MPART was verbally acknowledged as an innovative structure for improving response capacity to water contamination events.

One important aspect of disaster management involves monitoring and assessing emerging risks. A dominant theme in many of the meetings involved efforts, procedures, and challenges for assessing the status of PFAS contamination. Monitoring wells, testing procedures, and health studies were all touted as ways to reduce the uncertainty of the risks. Beyond the immediate response to the discovery of PFAS contamination involving systems for access to clean water and efforts to monitor the scope of contamination and resident's health, there appeared to be fewer specific disaster management activities. PFAS contamination is an ongoing issue. As one resident

noted, "I don't think you know how to get this stuff out of the water" (Oscoda PFAS Meeting, May 22, 2019).

In summary of research question one, town meeting themes indicated that communities enacted resilience towards the issues of PFAS contamination using all four of the CART frameworks, including caring and connection, utilizing resources, transformative potential, and disaster management capacity. They were enacted in different ways and to varying degrees as the crisis developed. The dominant themes from the meetings were connection and coordination of agencies and communities, information as a resource for engagement and empowerment and transformative potential in the form of changes to PFAS regulations. The highly coordinated, engaged and responsive MPART organization was a dominant theme of disaster management and response. Caring was initially represented by declined over time. While technical information was presented at all the meeting and dominated the discussions, high levels of uncertainty remained. These conclusions regarding town meetings are consistent with the larger view of the CART framework that resilience in enacted through communicative processes. Information dissemination as a resource and the coordination of responses, two dominant themes in the meetings, are grounded in communication processes.

Research question two asked, how have the people of Parchment, MI and Cooper Township organized towards collective action to address the issues made salient by the discovery of PFAS contamination? Based solely on the TOV framework as an understanding of community collective action, the communities of Parchment and Cooper Township were generally effective in utilizing collective action in response to the contamination event. Themes from the meeting celebrated a very rapid response enabled by volunteers and community organizations. In addition, an existing

framework of state agencies organized around PFAS contamination provided an additional structure of support.

The three voices of access, standing, and influence were present in Parchment and Cooper Township, indicating that the participation in collective action there can be considered effective. The presence of structural barriers around class, language, religion, and ablism are challenges that should be resolved. In general community members demonstrated clear ability to voice their minds and have those voices given due consideration within a collective community process of decision making. Town meetings in this case were sites of collective action where individuals, groups and organizations could share common interests. These coalitions enabled and facilitated by the meetings became the basis of collective action.

The meetings also provided evidence that Parchment and Cooper Township developed connections to other PFAS contaminated communities in the state. Parchment town meetings often referenced the contamination in Oscoda which was the first Michigan community identified as having a severe PFAS problem as well as contamination in Rockford. The creation of this coalition of PFAS communities created a sense that the Parchment contamination was not an isolated event, that community was not alone, and that the response needed to comprehensive. Themes from the meetings emphasized the need to create a tighter and enforceable standard at the state and national levels to transform how PFAS contamination was managed.

In addition to collective organizing among the contaminated towns, a coalition emerged among both established and emergent organizations. A variety of established environmental groups, including the Michigan Chapters of the Natural Resources Defense Council and the Sierra Club participated in meetings. The Kalamazoo River Water Shed Council and Huron River Water Shed Council were active in many of the meetings. Emergent groups, such as Parchment PFAS

Concerned Citizens, Need Our Water (NOW) and the Wurtsmith Restoration Advisory Board developed specifically in response to the contamination. Several of these groups establishing direct and consistent channels of communication among the community members to insure they were fully informed about the contamination and the response.

The third research question asked, how might the community of Parchment, MI and Cooper Township improve their capacities for resilience? Drawing again on the CART framework, f the town meetings suggest that Parchment and Cooper Township did develop resilience, but that there are opportunities for strengthening resilience. First, as evidenced by the declining attendance over time, a kind of PFAS fatigue set in. This was significantly complicated by the COVID-19 pandemic. Social distancing requirements pushed all meetings to a virtual format. These meetings had lower participation than the face-to-face format. The initial meetings in Parchment that followed the discovery of contamination had large numbers of participants who were very active in their engagement. Other meetings, such as the meeting convened by the EPA in 2018 included representative of many groups and was characterized by very active engagement. Both meetings were face to face. Future meetings may be more effective in increasing engagement if they are face to face.

Processes for creating community resilience might also best be presented as general community development efforts to enhance community characteristics such as caring and connection, utilization of resources and transformative potential rather than associating them with specific crisis events, which are usually of more limited duration. Resilience in this way should be treated as a generalized community capacity rather than a response to a specific event. This in consistent with the CART framework and other community frameworks that view resilience as a generalized community capacity. Several speakers, for example, noted the communities had

learned lessons from other communities and other incidents, such as the Flint Water Crisis. These helped improve the response to PFAS contamination. Learning form a crisis may be a useful strategy for creating more generalized resilience.

One of the most positive moments during the Parchment PFAS meetings occurred when the role of community volunteers in distributing bottled water was called out as an example of heroic effort. The Parchment high school football team, which was quickly organized to unload water, became a symbol of resilience. A second resilience-producing strategy is to celebrate successes in responding to crises. This allowed the community to publicly recognize and celebrate its capacity to respond.

A third strategy for enhancing resilience is to enhance and expand networks beyond the specific community impacted by a crisis to include government response agencies and other communities facing similar circumstances. Expanding networks to other communities experiencing contamination enhanced political influence and allowed communities to share lessons. Three of the Michigan communities most impacted by PFAS contamination, Rockford, Oscoda and Parchment, were sites of town meetings. Participants often referenced other communities during meetings. The MPART Citizen Advisory Group included 25 members representing communities throughout the state. One emergent group, Need Our Water (NOW), was founded in Oscoda and was credited with helping make PFAS contamination a national issue (Hayes, Jan 4, 2020). NOW members appeared at several of the town meeting. Resilience in this way was built both within and between communities.

The final research question asked, how might the community of Parchment, MI and Cooper Township improve their capacities for collective action? Several actions are suggested by the results from the town meetings.

Most evidently, effort should be made to increase accessibility to meetings. Meetings should be conducted within non-Christian spaces, outreach should be done to include members of the Jewish and Muslim population in the area, and ASL translators should be used at meetings. Although the community of Parchment and Cooper Township does not have a significant number of non-English speakers, efforts to increase accessibility broadly could include information in Spanish and Arabic (the second most commonly spoken languages in the state) (U.S. Census Data, 2020). Coinciding with the availability of the COVID-19 vaccine and additional safety measures, in-person meetings should resume in addition to continued virtual meetings. Meetings should be organized in secular spaces and at diverse times to insure access across class and religious groups. While local churches have been an effective organizing space, other religious organizations should also be leveraged to afford increased access.

Parchment should make use of direct democratic mechanisms in gathering community impressions and deciding policy, and Cooper Township should expand their use of these mechanisms. Barriers to this are likely structural and codified into local government, however, calling for public votes on important questions related to PFAS would greatly increase standing and influence within the community, even if these votes were not binding.

The coordination and cooperation among response agencies was a dominant theme in the town meeting. These agencies were often positioned as cooperating with and supporting local communities. Communities can enhance, leverage, and expand their capacity for collective action when they are able to work cooperatively with government agencies and elicit cooperation with PRPs. Government agencies are sometimes seen as impediments to an effective community response. Many crises associated with an identifiable PRP often become extended legal battles that delay and limit effective response.

While not explicitly evident in the meeting themes, there was a sense that the contamination issues were irreversible. Advice on what actions could be taken was limited to signing up for participation in the health study, stay informed, and avoid eating fish from contaminated locations and avoid contact with highly contaminated water of PFAS foam. Strikingly absent from the town meeting was empowerment. When residents feel powerless to make any meaningful impact, the motivation for collective action may be reduced. Finding activities that can make a difference and address emerging needs may spur collective action.

Some PFAS response activities included designated, official citizen advisory groups. These groups, drawn from the community, served as important liaisons to the community. Creating such groups and using them to connect to local resources and organization can help build a structure for collective action.

Theoretical and Practical Implications

Several additional observations can be drawn from the town meetings. First, collective action and resilience, although treated in most of the literature as separate concepts, appeared to be closely connected. The ability to enact resilience requires some sense of efficacy, or the perceived ability to have some impact leading to a desired outcome. In the absence of a perception of efficacy, communities may feel a sense of helplessness in response to an event such as water contamination. Collective action and the celebration of collective action can help establish a sense of control that may be necessary for enacting resilience. CART and similar frameworks for resilience could be expanded to explicitly address efficacy as the perceived capacity to take meaningful collective action.

Additional observations can be made about the town meetings. These communicative events are very widely used to engage communities around issues such as water contamination.

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They are places and space for sharing information, crafting resilience, and promoting collective action. The most engaging and well attended town meetings occurred early in the event. Interest dissipated over time.

Among the primary functions of these meetings were the dissemination information and coordination of community and agency responses. Sharing of information took up a majority of the meetings and much of the information was highly technical requiring subsequent questions and clarification. It was not always clear that the method of panel presentation by subject matter experts using content dense power point slides was the most effective form of communication.

Those meetings also included specific calls or commitment to action, and these calls especially when made by an authority figure, were engaging and effective. They often resulted in applause or cheers from participants. This may be part of the principle of efficacy described earlier and the idea that actions can be taken to address the problems (Houston et al., 2015). Pfefferbaum et al (2013) suggest, "Community resilience entails the ability of community members to take deliberate, purposeful, and collective action to alleviate the detrimental effects of adverse events" (p. 251). While communities impacted by PFAS had ability to take some collective action, especially early in the event, the ability to respond water contaminated with the forever chemical was limited. Deliberative action required organizing for political involvement and this as evident as local, state and federal elected officials attended and in some cases organized meetings. The involvement of political figures enhanced the relative influence of communities and community leaders. In one notable case of an EPA sponsored meeting, Congressman Upton spoke and indicated that he had helped organize the meeting. He noted that he had met with the mayor of Parchment the day before and then asked the mayor to speak. Many of the meetings included strong statements of support and commitment to take action made by elected officials. Politicians

were able to propose specific actions in the form of legislation around PFAS contamination. Collective action cases extended to leveraging political action.

These results also suggest that events like the PFAS contamination in Parchment and the community response cannot be understood in isolation. Parchment's ordeal was part of a larger set of PFAS contamination events, government regulations, and growing environmental awareness. It also occurred after the Flint Water crisis which had changed the way state agencies understood and responded to water contamination. In addition, the contamination intersected with the larger COVID-19 pandemic which changed how people could interact and the focus of their concerns.

Finally, PFAS is an emerging issue creating high levels of uncertainty about health impacts and level of harm the scope of the contamination and expected outcomes. This condition, associated with the nature of the event, may also account for the dominance of the information dissemination theme in the meetings. Many crises predicted to occur in the future, such as climate change, will be high uncertainty events requiring significant informational resources to facilitate collective action and resilience.

Future Research and Limitations

This analysis of town meetings points to other opportunities for additional research and engagement. First, comparing community PFAS response across various cities and states may help determine what other factors might influence the development of community resilience. The state-wide attention to PFAS, for example, was an important factor in Parchment and Cooper Township's response. It is likely that other states would not have such a comprehensive and coordinated response and that might reduce a community's capacity to enact resilience.

In addition, this study examined town meetings from August of 2017 – April 2021. While this investigation covered roughly a four-year period, many contamination events occur over a

much more extended time frame. The cleanup of some Superfund sites has taken more than 20 years due in part to extended litigation (Veasey, 1993). Longer term studies may help uncover patterns of resilience and collective action over time. Such investigations, for example, might identify ways to counter the community's contamination response fatigue. Moreover, the CART framework suggests that community resilience has some level of stability over time. In fact, CART points to experience with previous disasters as a component of the disaster response factor. The relative longevity of community resilience, including what factors might reduce resilience are worthy of further inquiry.

In addition, this investigation examined one kind of event involving a specific chemical contaminate. Other events, such as natural disasters, might produce different results. PFAS contamination is not visible while the impact from fires and floods can be dramatic clearly visible. Natural disasters typically do not have an identifiable PRPs, and this may change the way communities organize in response. PRPs provides an identifiable target around which a community might organize in opposition. In the case of Parchment, this was the Georgia-Pacific corporation.

Finally, this analysis suggested that the ability to take some meaningful action in response to a crisis, or perceived efficacy, is important to both collective action and resilience. Norris, et al (2008) note that "Collective action is complex and challenging in the face of environmental threats" and may involve both grass roots organizations and the established political leadership (p. 141). Collective or community efficacy is related to community competence, or the perceived ability to take meaningful collective action (Norris, et al, 2008). Others see collective efficacy as the shared belief that a community can effectively meet and overcome challenges through collective efforts (Benight, 2004). Future investigations of methods for communicating and promoting perceptions of agency and efficacy can help promote collective action and resilience. Agency, efficacy,

collective action and resilience may be overlapping concepts that function in a circular manner. Agency may facilitate collective action in a way that promotes higher perceived efficacy and resilience. It is also important to account for the nature of the threat and its impact on efficacy. Some crisis may produce a number of opportunities to take harm reducing collective action. Others may produce more limited opportunities. The residents of Parchment have been exposed to PFAS for many years. The face uncertainty over the impact and limited ability to reduce the contamination.

Limitations

There are several factors that should be considered when interpreting these results. First, this was one case study representing one kind of crisis within a specific community context. These results cannot be generalized to other events or communities. A much broader set of cases would need to be examined to determined how communities respond to events by enacting resilience. These investigations should also involve a diverse set of communities. Parchment and Cooper Township are predominately white and predominately middle income. Water contamination impacts many locations and many diverse communities (Campbell, et al, 2016). This study does not target communities which are particularly diverse. This study does, however, contribute to a growing body of cases exploring how communities respond to significant disruptions and the role communication plays.

This analysis is a systematic qualitative examination of a large data set. A single researcher coded and examined these meetings, and subjective bias undoubtedly impacted the results discussed here. Researcher perceptions and biases are discussed further in Chapter five, but include an environmental ethic, a belief that corporations bear responsibility for cleanup and a conviction that clean and safe water is a human right. Other perspectives, some of which were discussed in

meetings, reflect a willingness to accept low levels of contamination and a belief that the risk of PFAS contamination has been dramatically overstated. Disagreement over acceptable levels of PFAS in drinking water and polluter pay laws have defined much of the larger controversy. Future investigations should examine cases from a multitude of perspectives that acknowledge diverse perspectives and make use of larger coding teams to reduce the influence of one perspective.

Finally, this study only examined one communication channel, town meetings. Other channels, such as local media reports, or social media channels may have produced a different picture of how Parchment and Cooper Township responded to the contamination and what role the enactment of resilience played.

Conclusion

Intra-community communication is a key component of crisis response. Previous work has suggested that processes of resilience and collective action are communicatively co-constructed (Norris, et al, 2008). In this study, communities constructed resilience within and between communities, and these processes were evident in many town meeting conversations. Community members used existing organizations to distribute water and created new organizations to exert political pressure. They assembled to receive information, ask questions and express concerns. Town meetings are an important space for these processes to occur. In a community such as Parchment and Cooper Township facing a water contamination event the town meetings have a critical role as a place for the community to come together, communicate, deliberate and enact collective action. These actions both utilize and contribute to community resilience. In Chapter five, individual impressions of these processes are examined to broaden this understanding.

CHAPTER 5 - CONVERSATIONS

The experiences of community members in responding to the contamination of their drinking water may provide insight into how resilience and social capital function in response to this form of disruption. Descriptions of events, experiences and feelings can provide a set of grounded insights about individual and collective action and the role communication plays.

This chapter provides a review of literature and presents the results of a thematic analysis of 12 unstructured key informant conversations with community members from Parchment, and Cooper Township who are living with water contaminated with PFAS. Designed in accordance with the Relationally Attentive Approach to engaged communication scholarship, respondents were encouraged to give voice to their own stories and make sense of their experiences through an open-ended, participant driven conversation (Connaughton, et at, 2017). Interview design and subsequent analysis drew upon The Communication Theory of Resilience (Buzzanell, 2010) and the Social Capital Assessment Tool (SOCAT) developed by the World Bank (2002). The Communication Theory of Resilience provides excellent metrics to evaluate community resilience through the lens of community participants and provides a framework to understand the scaling up of personal resilience processes (evident within the key informant conversations) with community resilience (the focus of this analysis). The SOCAT provides direct mechanisms to evaluate social capital, and important prerequisite to collective action that can be assessed at the level of the individual.

Through conversations with the members of the community, this research worked to understand how the processes of resilience and collective action have manifested in the experiences of members of the Parchment and Cooper Township communities. The analysis also seeks to reveal the mechanisms by which collective action as internal community organizing

contributes to multi-scalar (integrated local, regional, global) action. Insights from this study are used to evaluate four research questions about resilience and collective action processes that have taken place within the community of focus. To reiterate, these research questions are:

RQ1: How has the community of Parchment and Cooper Township enacted resilience towards the issues of PFAS contamination?

RQ2: How has the community of Parchment and Cooper Township organized towards collective action to address the issues made salient by the discovery of PFAS contamination?

RQ3: How might the community of Parchment and Cooper Township improve their capacities for resilience?

RQ4: How might the community of Parchment and Cooper Township improve their capacities for collective action?

Integrated evaluation of these research questions is done through a multi-phase, multi-theory approach. This phase build on insights gained in previous chapters and leverages the theoretical frameworks of the Communication Theory of Resilience as well as the Social Capital Assessment tool as tools of analysis in examining participant conversations. Conclusions drawn within this chapter will provide support for the evaluation of the four guiding research questions in Chapter seven of this document.

Resilience

Resilience has emerged as an interdisciplinary concept for understanding constructive responses to a wide range of disasters, disruptions, and crises (Norris, et al., 2008). Holling (1973; 1996) defined resilience as the measure of a system's persistence and their ability to absorb change and disturbance while maintaining key relationships and structures. Resilient communities have the ability to absorb disturbances, improvise organize and "reorganize and retain functionality,

structure, and their essential identity" (Ayyub, 2014, p. 2). Resilience includes risk sensing and anticipation, adaption, and learning (Ayyub, 2014).

The Communication Theory of Resilience frames social resilience as a collective communication process by which individuals reintegrate from disruption and co-construct a new, post-disruption normal. Resilience is usually described an emergent and enabling process that draws on resources to facilitate constructive responses (Norris, 2008). Buzzanell describes resilience as a capacity to "bounce back" that develops through and is fundamentally grounded in the communication processes of "discourse, interaction, and material considerations" (2019, p. 1). Specifically, Buzzanell (2010) identifies five interrelated processes by which people enact resilience: (a) crafting normalcy, (b) affirming identity anchors, (c) maintaining and using communication networks, (d) constructing alternative logics, and (e) foregrounding productive action while backgrounding negative emotion.

The first of these processes, crafting normalcy, involves talking and acting in such away so as to enact a feeling of normalcy, and often is expressed by the creation of new normal routines. Crafting normalcy means carrying on and returning to activities even in the face of disruption. The second process, affirming identity anchors, involves enacting identities that may be threatened by or may be useful in responding to a problem, issue, or stressor. These identities may be roles, relationships, and functions. The third process, maintaining and using communication networks, involves the active reaching out to strong and weak ties in one's community for information, resources, and support. Utilizing networks for resilience may involve leveraging pre-existing community structures, creating new ties, or reinforcing existing networks. The fourth process, constructing alternative logics, speaks to processes of enacted sensemaking that are employed to reframe and reconstruct how one is thinking about a problem, issue, or stressor. This may involve

refocusing and reframing one's view of the disruption through community-based narrative co-construction. The final process, foregrounding productive action while backgrounding negative emotion, involves actively focusing on productive next steps while choosing not to let counterproductive negative thoughts interfere with this process. This reframing may involve a consideration of actions that can be taken to reduce or contain the harm of disruption. These five processes provide a nuanced framework to examine personal resilience, and the relationship between personal resilience and community and communicative effects Buzzanell, 2010; Buzzanell & Houston, 2018; Houston & Buzzanell, 2020; Venetis, Chernichky-Karcher, & Lillie, 2020). These five processes may be evident in the accounts individuals offer of their experiences responding to the serious disruptions from the contamination of their drinking water.

Social Capital Assessment Tool

Social capital concerns those aspects of social structure which are of value as resources to social actors and can be utilized to achieve desired outcomes, including creating effective responses to disruptions (Dynes, 2000). Social capital is a function of relationships and the personnel networks of social actors. Networks and structures of social capital can provide access to important resources for disaster response, including information, human resources, material resources and financial support (Aldrich, & Meyer, 2015). Individuals have varying levels of social capital, which are shared and constituted through communicative interaction.

Putnam (1995, 2000) described the general decline in social interaction within communities and connected this to a loss of social capital. Social capital, he suggested, included the networks, norms, and trust that grew out of interaction and facilitated collective action and cooperation for the mutual benefit of community members. Aldrich and Meyer (2015) argue that social capital is commonly conceptualized as positively related to disaster resilience in that it can

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enhance the overall resources available for response and recovery. Social capital can, however, also have a negative impact in that it can enhance the capacity of a community to create undesirable outcomes, such as unequal and discriminatory treatment of affected community members.

The social capital internal to a community is related to the capacity to organize and take collective action. In fact, collective action is often assessed in relation to the creation and utilization of social capital. Diani (1997) argued that social capital is a function of those social relations that allow for resources to circulate and be applied and for trust and social norms to develop and be reproduced. In other words, social capital is a form of strong and stable tie based on sentiments of mutual trust and mutual recognition/obligation, through which actual and potential resources are linked (Bourdieu 1986). Trust is also a general organizing principle that creates and maintains structural the logics social networks. Trust has also been used to assess social capital and the potential for collective action (Lusher, 2012). It is also key to civil and democratic processes, and facilitates bonding, identification, and group formation necessary for social movements (Putnam, 1993).

Collective action, then, involves the ways individuals, organizations and communities respond to serious disruptions and this grows out of social capital. Communication processes and structures are also necessary for the emergence of collective action in response to serious disruptions (Comfort & Haase, 2006). While numerous perspectives and approaches towards evaluating collective action exist, a unifying framework for analyzing, describing, and evaluating collective action in local community contexts has not yet emerged. However, the Social Capital Assessment Took (SOCAT) provides a useful tool for evaluating the primary component contributing towards collective action – social capital. Social capital includes those aspects of the social structure, used by social actors as resources for the pursuit of their goals (Dynes, 2002).

Social capital is a primary predictor of crisis recovery, and directly facilitates the crisis stakeholder's ability to activate and coordinate collective action (Aldrich, 2012). An absence of social capital can be expected to stall community recovery by directly impacting the capacity for collective action (Chamlee-Wright, 2010).

The SOCAT provides a flexible and effective perspective for evaluating different dimensions of social capital while remaining sensitive and adaptive towards cultural variation (Grootaert, & Bastelaer, 2002). While developed to assess the institutions, relationships, attitudes, and values between people that contribute to economic development, the tool is readily applicable towards collective action in response to crisis and disaster (Kawamoto & Kim, 2018). The SOCAT emphasizes cultural reflexivity and flexibility while maintain a unifying conceptual framework and prioritizes the building of a community profile to understand the forms and functions of social capital within the target community. The SOCAT recognizes that social capital exists in the relations among people and sees communication as critical to the cultivation and evaluation of social capital.

The SOCAT distinguishes between two primary dimensions of social capital – structural and cognitive social capital. The structural dimension includes the formal and external aspects of social capital - local organizations, formal networks, rules, precedents, and ways of doing. Kawamoto and Kim (2018) describe this dimension as containing three general types of social capital – bonding capital involving close family and friend ties, linking capital involving institutional ties, and bridging capital which connect outside of community boundaries. The cognitive dimension involves internal and informal aspects of social capital, such as trust, shared values, social norms, attitudes, and beliefs.

An additional dimension not addressed by the SOCAT is cultural capital, referring to the aesthetic and practical literacies necessary to understand and appreciate culture (Bourdieu (1986). Cultural capital has been found to be an important predictor of social support and may have influence on an individual's capacity to participate in collective action (Lee et al. 2016). It also fosters a kind of inclusivity, engagement, and social interaction that many facilitate collective action. Gray (2005) highlighted marginalization along cultural lines as one potential barrier to effective collective action. A lack of cultural capital may also contribute to alienation and a lack of access to organizing spaces (Senecah, 2004).

Cultural capital can be further operationalized in terms of embodied, objectified, and institutionalized capital (Bourdieu, 1986). Embodied cultural capital relates to cultural literacies acquired through socialization. Objectified cultural capital comprises of tangible property of an individual within a culture that can function to signal cultural belonging and communicate cultural knowledge. Institutionalized cultural capital relates to the formal recognition by social institutions, often in the form of a degree, certificate, or award. Social capital and cultural capital can facilitate the development of community networks and the emergence of collective action in response to serious disruptions such as water contamination.

Engaged Communication Scholarship

The scholarship of engagement is both a philosophy and an approach to systematic inquiry that privileges recursive and reflexive research practices. This approach is developed and executed in close partnership with practitioners and participants, to develop meaningful, practical, and applicable knowledge in service to participant interests (Simpson & Seibold, 2008, Connaughton, et al, 2017). Authentic and open communication is central to the project of engaged scholarship. The communication choices made by researchers and practitioners throughout the processes of

inquiry are critical to the success or failure of the scholarship of engagement. Dempsey and Barge (2014) understand engaged scholarship as primarily a process of relationship building between communities/collaborators and investigators and argue that engaged scholarship brings the relational communicative dynamics at the heart of research into sharp focus. Connaughton et al. (2017) argue for a *relationally attentive approach* to engaged scholarship, one which is built upon a critical examination of the communicative choices researchers make in interacting with respondents and populations, or 'co-collaborators'. The relationally attentive approach can be understood in terms of four key components. First, researchers must understand scholarship is continuously co-constructed throughout the research process. This process of co-construction is "fluid, dynamic and emergent" and open to both scholarly knowledge and knowledge of citizen respondents. Second, researchers must embrace the reciprocal relationship between communicative choices made when doing engaged collaboration and the impacts achieved through this work. In other words, communication processes are used to achieve positive change. Third, researchers must constantly be fostering the conditions for inclusivity through listening, dialogue, and spaces for multiple voices and perspectives. Finally, researchers must centralize the practice of reflexivity about their relationships and positionality towards their research and target communities. This involves three components, do no harm to the communities involved in research, maintain reflexivity about goals and processes, and maintain mindfulness about power dynamics (Connaughton, et al, 2017).

Qualitative interviews as relationally attentive research

Interview based studies are often framed as ethnographic endeavors that work to "locate the knowledge people carry in their heads" and understand the attitudes, beliefs, and values that drive their actions (Skinner, 2013, pg. 71). While interviews are effective tools supporting several

research goals, the core strength of interviews over other investigative methods comes through the active process of *listening* as respondents reveal what they are conscious of (Cohen & Rapport 1995). Researchers seeking to do relationally attentive interviews must be longform, open-ended, and participant driven, with an onus on the researcher to listen reflexively and recursively to the information the participant chooses to reveal. Interviews should manifest a deep respect and appreciation for the local knowledge of respondents. Conversations should remain fluid, dynamic, and create space for inclusive participation. The goal is to listen, hear and understand the respondents. Probing questions should be used carefully and minimally, if at all.

In addition, a process of ongoing research self-reflexivity should continually examine relational and ethical dynamics (Connaughton, et al 2017). Ellingson (2008), in describing the crystallization framework, argues that knowledge is never neutral, unbiased, or complete, and that the pretense otherwise allows researchers' personal perspectives to shape and limit participant narratives and world views. The researcher's specific limitations from vulnerabilities and positionality should be openly acknowledged even as imperfect claims about socially constricted meanings are made (Ellingson, 2008). Relationally attentive approaches to interview-based work are a direct way to combat these inherent limitations. Participant voices must be respected and considered as valid, and researchers have an onus to honor these perspectives in their representations of their research. This philosophy and approach was employed in a series of conversations with key informants in the Parchment and Cooper Township water crisis.

Method

Interviews

Data were collected through a series of 12 unstructured key informant conversations. Key informants had varying roles and experiences with the PFAS contamination of the community's drinking water. Key informants were members of the community who may be experts or have unique situated knowledge in the topic, have specialized sources of information, or have unique experiences related to the topic (Marshall, 1996; UCLA, 2020). The key informants in these conversations possessed specialized knowledge and understanding of the community and provided on-the-ground insight into the process of the community's response to the contamination event.

Initial key informants included county public health officials, city government officials and members of community groups, including the leaders of Parchment PFAS Concerned Citizen Coalition, as well as individuals identified as prominent respondents in town meetings addressing the issues of PFAS contamination and the response. Ten key informants agreed to be interviewed, and of these ten, two individuals were contacted for follow up interviews to explore themes which emerged through the analysis. The informants interviewed in this analysis are described in Table 7.

Table 7. Key community informants

Key Informants	Age range	Gender	Education	Role in response/community
Respondent 1	70s	M	Ph.D. or equivalent	Bystander
Respondent 2	70s	F	Ph.D. or equivalent	Bystander
Respondent 3	30s	F	Ph.D. or equivalent	Leader, Local Health Department
Respondent 4	60s	M	Masters or equivalent	Leader, Faith-based Organization
Respondent 5	50s	F	Bachelors	Actor, Local Government
Respondent 6	50s	M	Bachelors	Leader, Local Government
Respondent 7	30s	F	Bachelors	Community Activist
Respondent 8	30s	F	Bachelors	Community Activist
Respondent 9	30s	M	Bachelors	Community Activist
Respondent 10	30s	F	Bachelors	Community Activist

As shown in Table 7, broad organizational diversity was represented in the informants interviewed for this study. Two informants were actors within the local Parchment City government, one a high-ranking elected official, and another a mid-level clerk. One informant was a leader of a prominent faith-based organization that was directly involved in the immediate response to the issue, serving as a meeting site and a water-distribution site at two different points in the timeline of the response. One informant was a lead actor within the local health department. Two informants were retirees, witnesses to the entire response process but not actively involved with any organization-based response. Finally, four informants were citizens who were visible community organizers around the issue.

The communication theory of resilience provides some guidelines for assessment of the five interrelated processes of resilience, and Wilson et al. began the work of developing and validating the Communication Resilience Processes Scale (2019). This scale directly informed many of the questions assessed in these interviews. Questions center around both current appraisal of a community's resilience and needs as well as informants' ideas to improve the community's capacity for resilience and collective action. The SOCAT was used as a complementary framework and provided additional guidelines for participatory interviews. These include emphasizing the definition of community boundaries, identification of community assets including local organizations, community governance, and decision-making processes. In particular, the SOCAT emphasizes comparatively long discussions between researchers and community members. These guidelines were used to design and direct the interviews conducted in this research phase. Specific questions assessed in these interviews are included in Appendix A. Questions address each of the five interrelated resilience processes, as well as key community aspects related to social capital, and were adapted to fit the context of the community.

Interviews were conducted remotely over the phone, recorded, and transcribed for later analysis. The Institutional Review Board at Purdue University approved data collection and interview protocols used for this study, and all approved protocols were closely followed. In keeping with principles and guidance of the Relationally Attentive Approach, these interviews were generally unstructured and participant-driven, with the researcher assuming an active listener role. Direct questions drawn from the communication theory of resilience were asked, but effort was made to minimize probing questions and to allow respondents to direct the flow of conversation as they wished. In most cases respondents came to the conversation with a clear story

to tell, and the only minimal work from the interviewer was necessary at the start of the interview to elicit these stories.

In-person participant conversations and participant observations likely would have produced more complete, richer data and relational ties between the researcher and community members as well as allow the researcher to better discover information about community responses to PFAS contamination. Due to the ongoing circumstances of COVID-19, in-person interviews were not possible. This necessarily reduced some of the richness of data and insights that could have been gleaned from qualitative interviews. The remote format and the circumstances of COVID-19 created significant barriers to the recruitment of interview respondents. The remote format for interviews did not negate the value of this research phase and the utility of the interviews. To adapt, potential respondents were recruited by email, mail, and telephone, and interviews were conducted remotely over the phone due to wide availability of this remote channel to informants. Interviews were recorded and transcribed for later analysis. Transcriptions were approached from a thematic analysis methodology to address the research questions.

Recruitment

Various recruitment messages were distributed throughout the community of Parchment and Cooper Township. Social media messages were posted on sites where collective action organizing around issues of PFAS had taken place, as well as sites dedicated towards general issues facing these communities. Primary targets for recruitment were Facebook pages for Cooper Township, Parchment, and the greater Kalamazoo area, as well as pages dedicated towards issues of PFAS contamination and water quality. Physical flyers were placed at sites within the community and made available through the Parchment Library and a newsletter for a local church. Some individuals previously identified through their public actions around the issues were

contacted directly by email or by mail. In addition, local elected officials and public health officials were contacted directly.

Respondents were volunteers, and no attempt was made to gather a representative sample or avoid self-selection bias. The goal of this study was to supplement insights gained through the meeting analysis to cultivate holistic understanding of community processes or resilience and collective action. In keeping with the principles of engaged scholarship, these conversations were offered to community members as opportunities for their voices to be heard and contribute to understanding and to work through their experiences with issues of PFAS in a relationally attentive conversation. Respondents who were willing to be interviewed were individuals who continued to be involved around issues related to PFAS. All respondents were individuals that had achieved a degree in higher education, and three of the respondents had previously received a degree from the university through which this research was conducted.

Two respondents were contacted for follow-up interviews after the resolution of a major lawsuit concerning PFAS issues in the community, and the passing of a major piece of legislation regarding PFAS. These respondents were contacted because they specifically had been involved in the processes related to these two events, and the researcher felt that their input on these events would be relevant.

Respondents and General Overview of the Interviews

The interviews were co-constructed listening sessions that lasted from 40 minutes to 60 minutes. The interviews were arranged at times that were convenient for the respondents. Respondents were entered into a drawing for a gift card as compensation for their time. In total, twelve key informant interviews were conducted over a two-month period. Interviews took place over the phone and were audio recorded. After the interviews were completed, the recording was

transcribed by the researcher and the audio recording was destroyed. Transcription resulted in 98 pages of single-spaced text.

Considerable challenges occurred in the recruitment of respondents. Some of the challenges were associated with the limitations of technology. Some found the on-line informed consent agreement difficult to complete and did not follow up with contacts. Many potential respondents declined, indicating issue fatigue and a general interest in "moving on" and not revisiting the incident. Several indicated their frustration with lack of progress in resolving the issues and felt further discussion was not constructive. This phenomenon of issue fatigue also emerged as a prominent theme throughout the conversations with the community and is discussed in much more detail in the analysis.

Despite these challenges, key-informant respondents came with grounded knowledge, rich and detailed descriptions, and deep insights about their experiences and understandings of the contamination event. Respondents included elected representatives from local government, actors from local health organizations, leaders of local faith-based communities, retirees, young community members, and activists organizing on the local, state, and national level. The interview respondents represented a good cross section of the Parchment community, coming from diverse economic, political, and social backgrounds, and representing various age groups. As a group, the key informants can be described as individuals with moderate to high levels of sustained involvement with the PFAS contamination. This may have influenced their agreement to participate in the interviews. In some cases, this involvement was related to their positions and jobs (elected officials, public health official) and in other cases, their involvement was through community-based collective action. Many had powerful and very detailed stories suggesting that their experiences with the contamination were very memorable. Their stories tended to be arranged

in chronological fashion as a coherent narrative and included descriptions of key events, decisions, and respondents. Many expressed strong attitudes and emotions associated with the contamination, potentially responsible parties, community response, and local and state level government response. Notably, although there was attitudinal variance towards the issues of PFAS, there was remarkable consistency of themes across the interviews.

Thematic Analysis

Thematic analysis is a method for identifying, analyzing, and interpreting patterns of meaning within a qualitative data set (Braun & Clarke, 2006). Themes are descriptive and organizing codes that emerge from a text or data set based on the systematic and repeated reading of the text (DeSantis & Ugarriza, 2000, Vaismoradi, et al, 2016). This approach functions through total immersion within a data set, allowing codes to emerge and function as building blocks or larger themes within the data. Coding is a theorizing activity and should draw on existing theory while also being transformed to match the text. Codes were derived from the literature and based in the communication theory of resilience and the SOCAT, as well as broader literature in resilience and collective action discussed in Chapter two. Inductive data analysis was also used throughout to identify emergent codes present in the data. Code memos (Gibbs, 2007) and analytics strategies (Corbin & Strauss, 2008) were used to reflect on data and to inform analysis.

The themes for the analysis were drawn from Buzzanell's (2010) Communication Theory of Resilience and the Social Capital Assessment Tool. The analysis looked for instances of participant rhetoric which showcased the five interrelated resilience processes, and/or the three voices of access, standing, and influence. Identification of these themes within the data required careful context-based coding. It was not sufficient to merely identify a grammar of resilience and participation. The researcher looked for narratives which sought to establish new normal, which

drew on personal and community identity, and which leveraged and built relational ties, sought to make sense of the issue, advanced productive action and diverted focus from negative thoughts and feelings. The five inter-related processes of resilience and their manifestations in these interviews are summarized in table 8.

Table 8. Themes of resilience

Normalcy
Narratives of day-to-day life pre and post crisis
Narratives of recovery
Communication Networks
Organizations
Personal relationship
Meetings and gatherings
Constructing Alternative Logics
Sensemaking processes
Narratives of the crisis event
Cause-and-effect/blame/responsibility
Foregrounding Productive Action
Risk reduction strategies
Preventative action
Information seeking behaviors
Backgrounding negative Emotion
Legitimizing negative feelings
Acknowledging harm
Lack of anger/grief/sadness

Discussion of bonding capital and bridging capital in the form of social ties and cognitive capital in the form of trust, shared values, and shared beliefs was coded as social capital. Cultural capital was an emergent theme not included in the SOCAT framework which was utilized to account for participants' widespread use of cultural narratives. Instances where interviewees demonstrated community knowledge and cultural literacy, cultural belonging, or cultural standing were coded as cultural capital. Social and cultural capital and their manifestations in these interviews are summarized in table 9.

Table 9. Themes of social capital

| Structural social capital |
| Bonding ties |
| Linking ties |
| Bridging ties |
| Cognitive social capital |
| Trust |
| Emphasizing shared values |
| Emphasizing shared attitudes |
| Emphasizing shared beliefs |
| Cultural Capital |
| Embodied capital |
| Objectified capital |
| Institutionalized capital |

Analysis

Resilience Themes

Crafting normalcy

Normalcy is created when "people say and do things to put their lives back in order, to achieve normalcy" (Buzzanell, 2018, p. 3). Re-establishing routines, connections that affirm relationships, patterns of interaction are behaviors and activities that allow normal access to resources and can help reestablish a sense that life has returned to normal after some disruption. Return to more familiar use patterns may both construct and signal normalcy. Descriptions of efforts to create and search for normalcy were evident in the key informant interviews.

Throughout the interviews it was clear that each respondent had adapted to living with the issues of PFAS contamination. This 'new normal' was enacted in several ways. Many respondents had incorporated routine risk-reduction strategies into their day-to-day life. These included running their tap water before drinking or using it, acquiring, and using bottled water, avoiding eating fish caught from contaminated water, etc. Some reported a new understanding of the risks of drinking water contamination. Others had worked to address practical or related problems created by the crisis. Replacing lead pipes damaged by the transfer to Kalamazoo city water, for example, was reported to improve overall drinking water quality.

Many of the interviewees also reported that they engaged in cognitive work to put the issues behind them, to attempt to return to the normalcy experienced prior to the crisis. In these cases, the primary factor interfering with returning to the normal prior to the discovery of PFAS was uncertainty relating to health impacts. At the time of the interviews, little to no information was available concerning direct impacts of PFAS on the health of community members. While a health study has been initiated, results will not be available for many years. The lack of information was

very clear to respondents and created uncertainty as to their current reality and health condition. "Am I sick? Who knows?" (Respondent 2). One resident connected this uncertainty with overall hesitancy to engage in health testing and participate in collective action, "a lot of it was self-preservation and just needing to not know" (Respondent 9).

Individuals engaging in risk reduction behaviors seemed to relate better to these uncertainties than individuals who reported that they had not changed behaviors, but no interviewee related well to these uncertainties. The high level of ongoing uncertainty about health effects and a limited capacity to reduce uncertainty was described by several of the respondents as defining characteristic of the contamination.

An additional factor impacting the capacity of interviewees to enact a new normal was COVID-19. The onset of the pandemic created additional factors requiring management and response. Many of the behaviors that had been put in place following the discovery of PFAS had to be further adapted, or in some cases abandoned, following the onset of COVID-19. Interviewees reported a general feeling that the COVID-19 pandemic was "wrapping up" (Respondent 3) and that things would "get back to normal soon" (Respondent 1). What this would involve varied from person to person. In some cases, resuming normal face-to-interaction with neighbors and family members was seen as the primary characteristic of normal, non-pandemic life. For others, ability to devote intellectual resources to other health concerns, such as those stemming from PFAS contamination, was seen as the normal that could be returned to following the resolution of the pandemic.

Communication networks

Networks of communication and relationships are important sources of support providing information, resources, and the capacity to a response. The leveraging of resources through

communication helps craft resilience (Buzzanell, 2010). These networks include established connections and linkages with friends, neighbors, family, co-workers as well as larger connections between organizations. Key informants indicated that networks from existing community structures and organizations were important in developing and applying resources. These includes schools, political institutions, and churches. "Different groups ... the Red Cross was an obvious, you know, they were obviously going to jump in and help it at whatever they could, school groups, and Boy Scout troops. And Girl Scouts, and, you know, from all around the county who, who wanted to, you know, wanted to help" (Respondent 6). Most of the interviewees reported that the local high school was a central organization for resources in the response. The connections facilitated through the school were credited with providing a network of support following the crisis. The ability of the high school to function as a distribution site and organization site for bottled water, as well as the capacity of the school infrastructure to meet the needs of the crisis, was highlighted in several interviews. "We had the football team was showing up for - to a practice their summer practices and they came, they helped unload the trucks to get the cases of water out" (Respondent 5). Extant school contact lists were repurposed for risk messaging, according to one participant involved with the process.

The primacy of the high school in facilitating organization around the issues of PFAS may be a contributing factor in the observed age gap within the community response. Young parents with children in the schools were the primary organizers following the crisis. Older individuals interviewed reported that they did not participate in meetings, and generally showed less interest in collective action. Participation in the schools appeared to create a network connection that enhanced engagement with the response.

Town halls were identified by interviewees as the primary place and networking structure through which information was sourced to and through the community. These meetings also made use of local political networks to identify and distribute informational resources.

> "So pretty quickly, we established a town hall so that people could come and ask questions about the situation, and it wasn't just limited to those that were in the area. I think other people came as well, but really our goal was to try to answer whatever questions we could, and this panel included residents. Also, DEQ or EGLE, I think they were still DEQ at the time. And then I believe DHHS was there as well. And we might have had a person from EPA on that one. … after that first town hall that we had, we gathered emails and contact information. So we were starting to send out like a weekly email to everyone that signed up to give them the latest information that we had" (Respondent 2).

Town halls were described as sites for both community and government interaction and organizing. Interviewees saw the meetings as important in both making and demonstrating network connections. The connections made at meetings were then used to establish additional connections through email.

Connections between local organizations and state and federal agencies were also highlighted as important networks in the response to issues, and many respondents lauded the role of these agencies in the response. Local government actors discussed how widespread communication between agencies and the local government was immediately after the crisis. "We had weekly, actually daily, for 30 days, meetings with our Emergency Operations team, which involved our City personnel to County personnel… everybody that was involved in in this situation, because it was truly a collaborative effort. And we also have the EPA. So we have the state, we have the county, we had our local government. We had the federal government involved. Also loosely all Kalamazoo" (Respondent 5).

The role of the state and local government was particularly lauded by most respondents. "Despite the way they handled Flint, I think Statewide for the PFAS that they've been more responsive" (Respondent 1). "I could not imagine a better group of people to be in charge. It was,

it was really a thing to behold" (Respondent 6). However, the capacity of these agencies to listen to community concerns and work with community actors was called into question by a few respondents. One interviewee bitterly remarked, "after the town hall the state kind of left us" (Respondent 7).

> "I can just speak to the relationship between us and the state. Is that sometimes it felt like that they were holding back information for a while. Trying to keep it like in a box and it's just like come on like, where are your partners? We need to be able to know what, you know, because one of the big things from my perspective, and the emergency preparedness perspective, is that everything starts locally. So while, you know, the state can come in and do their investigation and, you know, say whatever they want to say, make people mad or happy in some cases, I don't know, mostly usually make them mad. They get to go back to Lansing" (Respondent 2).

Representatives from local government and health organizations were quick to highlight the role that state and county actors had in the response process. "We've been so fortunate in our partnerships over the years, in terms of our response that that we know we have the ability to call people and know that we're going to get help... We don't have access to all the resources. We don't have everything that we need, so we have to have those partnerships" (Respondent 2). While state actors were discussed by interviewees, the majority of the credit was given to networks of resources between local health departments in surrounding communities and in other affected communities. Capacities to share resources, including information and strategies, between local governments and local departments was seen as a powerful networking force aiding the response. One government representative explained how the initial solution came about, "fortunately, we have a good relationship with our neighboring city Kalamazoo… and when the city recognized we had an issue, they actually came to us and said, hey, we can help you, you can tie into our water because we're so close" (Respondent 5).

Churches were also described as places and organizations for networking around issues of PFAS. Unlike the high schools, churches were a primary networking space for older adults within

the community. One respondent noted, "real trend lately of religious organizations that have seen the congregations getting older. And younger people are not joining like the older generation did" (Respondent 4). Churches were used both as locations for some of the early town meetings regarding PFAS and as water distribution sites, providing the critical resource of space for the community. "It was Haven Reformed Church, once school started they volunteered their parking lot for us to distribute water" (Respondent 6).

The divide between younger community members, who primarily organized through school networks and were more involved in collective action, and older community members who organized through churches, was highlighted by many respondents. "There's two groups in our community. There's the golden-agers, which are, you know, kind of retired and senior citizens. And then there's the starters and singles and young people… there isn't a lot of interaction and any connectivity that you see" (Respondent 4). This divide contributed to challenges in sustained collective action discussed below.

Social media was commonly discussed, however the consensus from most key informants was that social media was not an effective site for organizing. "We have people that use social media for, you know, they're 'trolls' the word is… they have an entirely alternative agenda" (Respondent 5). "I think the biggest problem is misinformation… that's the biggest challenge today and it's divisive. Social media is divisive" (Respondent 6). One community member connected social media with exacerbating the generational divide within the community. "Social media needs to take more of a responsible role and a lot of the health information misinformation that is put out there. The older generation I know will read things and take them as truth." (Respondent 7).

COVID-19 created additional barriers regarding the use of communication networks. Multiple interviewees reported that the onset of the pandemic reduced their ability to interact with their neighbors and their broader community. As social distancing was imposed, face-to-face meetings ended. Key informants noted that this disruption most severely impacted older community members. Younger respondents reported greater willingness to use technological solutions to navigate the social distancing requirements. Older respondents were less technologically proficient, and less willing to engage. One key informant reported, "pre-covid, you know, once or twice a week, we would get together, not anymore" (Respondent 1).

Constructing alternative logics

Alternative logics involves alterative sensemaking through "transformative action when old ways of behaving fail to make sense or are no longer an option" (Scharp, Kubler & Wang, p. 211, 2020). Alternative logics often concern change through what may seem like contradictory ways of thinking, talking and acting that may reframing the situation. Themes reflecting these alternative ways of making sense involved attributions of cause of the disaster, efforts to understand the contamination through the framework of other events, and an intentional effort to not think about potential health impacts.

Every participant presented a clear and internally consistent narrative of the crisis, including the origins of the contamination and who was responsible. The paper mill, both as a foundation of the community and as a source of the contamination, was highlighted by every interviewee. A stark generational divide was apparent – older community members, "the paper mill generation" (Respondent 4), were more likely to frame the mill as overall a positive for the community. The mill had been a source of jobs and provided prosperity. Younger community members, however, would focus almost exclusively on the negative health impacts of the mill.

One young parent active in the response angrily remarked "that paper mill is a rotting pile of garbage just leaking into the ground into the river. I mean, it's disgusting" (Respondent 8). The responsibility for the contamination was identified by the key informants as the last owner of the mill, the Georgia-Pacific corporation, although the majority did not feel that the corporation had behaved unethically.

Other water crisis events were commonly evoked by interviewees to construct understanding of the issues of PFAS and position the contamination within a larger context. One community leader explained, "we learned a lot from the Flint Water Crisis" (Respondent 5). A resident reflecting on the larger need for federal regulation remarked, "it doesn't take much digging to find out what happened in the Ohio River Valley with Dupont and with very similar compounds" (Respondent 9). Others discussed ongoing PFAS crises in other Michigan communities; "the Rockford water situation up there," (Respondent 6) "Oscoda is getting, excuse my language, royally screwed by the federal government" (Respondent 9). Two respondents originally lived in West Virginia and drew on their experience with pollution there to understand and contextualize the issues in Parchment.

> You know, having grown up in West Virginia, we saw a number of disasters due to shoddy practices from coal companies. Ever hear of the Buffalo Creek, mining disaster? I forget how many battles before anybody got a dime out of the coal companies for that. And it's been in the last five years that there was a mining disaster back there. A bunch of miners were trapped again. Shoddy Business practices up here [too]. You know the Enbridge Oil Business? They had a pipe break into the Kalamazoo River. It's been maybe five years ago, you know, the cleanup still continues. Line 5 coming across under Canada or into Canada. You know, people don't trust that it's safe. Yeah so you know, I'd like to thank that many of those kinds of unsafe practices don't happen, but if there's opportunity to make a whole lot of money, there is the risk that they're going to cut corners (Respondent 1).

Few interviewees assigned blame towards specific actors – not to the mill, the local government, or any of the principle responsible parties involved with the crisis. Many respondents

were quite forgiving. "I don't feel angry or bitter, because I don't think I don't have anyone knew. I would feel entirely differently if I thought they knew and they concealed it and went ahead and did what they did" (Respondent 1). One exception came from a prominent political activist in the community, who critiqued the response to the crisis on local, state, and federal levels. "I feel resentment and bitterness namely towards the EPA… I've been disappointed with the Republican party… I was disappointed with Margaret O'Brien, who voted against regulation bills… I have really mixed feelings about the city of Parchment" (Respondent 7).

Interviewees also reported an alternative logic regarding the potential health effects and the associated uncertainty. While concern was expressed about the potential health effects, interviewees reported that they avoided dwelling on what was unknown.

Foregrounding productive action

Foregrounding productive action emphasizes taking positive steps in relation to the disruption and includes focusing on positive aspects of their situation while managing the negative (Buzzanell, 2010). Negative feelings are almost always present in serious disruptions such as crises. Legitimizing negative feelings, while foregrounding productive action acknowledges these inherent negative affects while emphasizing efficacy in response to move forward with positive steps.

Interviewees struggled to foreground productive action, with the majority indicating that they did not see any meaningful action that could be taken to mitigate harmful effects. Respondents generally saw this as a shared attitude across the community. "It just kind of seemed like people were like, okay, I'm just done with this. I think there was a lot of mental anguish… PFAS consumed their lives for so long and there was nothing that they really could do about it" (Respondent 2). The uncertainties related to the timeframe of the crisis as well as the health impacts contributed to

a general feeling that nothing could be done. Lack of clear information about potential health impacts was identified as the major factor interfering with productive action. "It's heartbreaking. And when somebody asks you like, well I've been drinking this water for this long. You know what's it's going to do me? I don't know. That's not the answer. So it made things really, really challenging, that we just don't have the science" (Respondent 4).

The difficulty in managing the uncertainty associated with the contamination was reflected in almost all the key informant comments. It was also identified by one public health official as a factor or in mental health issues experienced by many members of the community.

Age was a primary factor identified by multiple interviewees as a primary factor behind people's willingness to engage in corrective behaviors and positive actions. "When it first came up a lot of people with young children, understandably were extremely upset and switching all their water consumption to bottled water" (Respondent 3). Those interviewees who identified as older were less interested in changing behaviors. Even with specific behaviors like blood testing, the lack of clear beneficial outcomes made it difficult for community members to understand the value of these behaviors. "I'm not going to go, I don't care, I don't want to know it's, you know, no pun intended, but water under the bridge" (Respondent 5).

Backgrounding negative emotion

Backgrounding while legitimizing negative feelings acknowledges the harm that occurs with a serious disruption without allowing the emotions to limit positive action. Most respondents reported that they had effectively backgrounded most negative emotions concerning issues of PFAS contamination. In some cases, the lack of certainty about the health impacts contributed to an attitude of "we don't know about the health impact, so I'm not going to dwell on it." There were

notably exceptions, and the majority of respondents displayed mixed at best emotions towards the issues.

Respondents seemed to have accepted the reality of the issue and the reality that they may experience long-term negative health impacts. One interviewee remarked with sadness, "I think there's a resignation or an acceptance of the situation" (Respondent 6). The degree of this acceptance did vary from participant to participant, and directly tracked, as described, with the age of the interviewee and whether the interviewee had young children in the community. One resident summed up a sentiment expressed by many interviewees, "if my kids were young right now... You know, my kids are in college and whatever. I feel like, if my kids were younger, now, I might be a little bit more concerned" (Respondent 6). Those residents who reported that they were older with grown children neither reported nor demonstrated strong feelings of bitterness, anger, or sadness related to issues of PFAS, and seemed most interested in moving on from dwelling of this issues. One interviewee explained the lack of activity from older residents, "I've talked to my neighbor who's been in her house since 1959 who will not participate in the health study. It does her no benefit. She's lived to be in her 80s" (Respondent 9). Respondents who reported that they were parents with younger children in the community repeatedly reported feelings of anger, frustration, and powerlessness. These individuals were also the most likely to have engaged in political advocacy around these issues.

Affirming identity anchors

Identity anchors are the "relatively enduring cluster(s) of identity discourses upon which individuals and their familial, collegial, and/or community members rely when explaining who they are for themselves and in relation to each other" (Buzzanell, 2018, p. 4). These discourses may include identity narratives, roles, relationship clusters, affiliations, and membership in

families, organizations, and communities. This aspect of enacting resilience involves using discourse to reaffirm, regain and maintain an identity that existed before the disruption (Buzzanell, 2010).

Community membership was a key identity anchor for many respondents and was evoked to establish cultural and community belonging in Parchment and the greater Kalamazoo community. Most respondents admitted Parchment is not really an isolated community "we're really a part of Kalamazoo" (Respondent 1), "Parchment is a small Kalamazoo suburb" (2), "we really are basically attached to Kalamazoo" (Respondent 4), "We're kind of a bedroom community without any real industry in Parchment itself" (Respondent 5). However, interviewees displayed pride in their history and legacy in the community, as well as the small-town character of Parchment. "We actually live in a house that was built for Paper Mill employees" (Respondent 1). "My husband, you know, his parents live two miles away, he grew up in this community" (Respondent 6).

In describing the community, most interviewees drew upon the founding narrative of Jacob Kindleberger, and positioned their identity in relationship with Kindleberger and the mill. Kindleberger, the founder of Parchment, has established a community ethos that was evident in comments made by elected officials. Moreover, the legacy of the community he created was evident in the current structure of social capital as discussed later.

Social Capital

Structural social capital

Interviewees reported broadly utilizing linking and bridging ties in their response to the crisis, but less so in subsequent collective action. As noted earlier in the discussion of

communication networks, linking ties between local institutions were very important in the immediate response to issues of PFAS, leveraging support, distributing resources, and organizing for collective action. This included connection with and between institutions and organizations including government, schools, and churches. One informant, who worked in county government, related how she used her knowledge and relationships to leverage support from the schools and the local football team to distribute water. Respondents also emphasized organization-based bridging ties connecting to external actors, particularly actors in government agencies and other local communities. These ties were most often described as a function or organization affiliation or personal relationship, such as member of a church, or affiliated with the high school. The community's capacity to rely on these ties was widely discussed by respondents that were directly involved in the immediate response to the crisis.

Bonding capital in the form of personal relational ties was also a primary factor in the response. "We're all supportive on a community level" (Respondent 8). "We were all there for each other. People that didn't know each other that, well, people with different, as I said, political backgrounds, different religious backgrounds" (Respondent 10). "There were a lot of people early on who wanted to support their neighbors, asking, do you need extra water? what do you need? So on a community level, Parchment showed up" (Respondent 9). A picture of an idyllic small town with close connections was evident in the interviews, and many respondents characterized community in these terms. The idea of community, and the associated responsibilities to one's neighbor, created powerful ties creating and sourcing social capital.

While bonding capital facilitated some of the effective information sharing in the early stages of the crisis, respondents indicated that these ties were not effective in facilitating later collective action. This could be a function of the natural progression of the event and the tendency

to pull together in the initial response, a factor of the social distancing requirements of COVID-19, or both. Respondents credited the failure of these ties in larger collective action to overall issue fatigue throughout the community.

The larger issue of PFAS contamination itself proved to be a driving force in the creation of new bridging ties between affected communities. Interviewees engaged in political advocacy spoke generally in terms of inter-community ties more so than intra-community ties. One key informant with role responsibilities in the response noted, "If it weren't for other people from other communities, they're what has allowed me to take time off to, you know, focus on my own needs and my family without, you know, getting to burned out and being able to come back" (Respondent 7). This sentiment of the necessity of sharing burdens was echoed by other respondents, "You burn out and everybody does because it's a thankless job as an unpaid job, you know?" (Respondent 10). In other cases, respondents noted members of other communities has attended Parchment PFAS meetings to show support and advocate for change.

Cognitive Social Capital

Cognitive social capital in the form of shared values and norms was expressed in some form by each interviewee. Many discussed at lengths their conformity to the overall values and culture of the community, an aspect discussed more in depth in the Cultural Capital section below. Many individuals, particularly those involved in local government, emphasized the degree of trust that others in the community placed in them. Trust between communities was also emphasized. "I'm a big believer in collaboration and we, you know, it's kind of like it, you know, develop relationships with your neighbors before, you need them" (Respondent 5). Others noted the active and supportive role of state agencies and government, although some respondents expressed anger that the lack of government regulation had allowed the contamination to occur.

Almost every participant emphasized the importance of community values in response, particularly values related to care. Two respondents, when reflecting on community care, highlighted a recent incident which resulted in community collective action. "There was a young woman who just graduated from high school, who was in a terrible car accident and the whole community has surrounded her family" (Respondent 4). "That kind of just happens when someone in Parchment gets impacted, the community comes to support" (Respondent 5).

Individuals engaged in political advocacy discussed at length how their values differed from those of the larger community. One prominent activist reflected on the difference between their activities and those of less active neighbors, "These are people who are strongly Republican and don't normally associate themselves with political, you know, environmental type issues" (9). A commitment to democratic values was presented by these individuals as a primary cognitive social capital creating ties between affected communities across the state. Another participant remarked, "Your vote is your voice and people who vote are going to be the ones who decide who runs the show and who does what and what issues are important" (Respondent 8).

Cultural Capital

Cultural capital was primarily evident in the interviews through embodied capital. Each interviewee evoked some narrative of local culture, with many telling a version of the founding narrative of the community. "Jake Kindleberger, the founder here and the head honcho" (Respondent 1) was discussed by many respondents. "Parchment was a paper mill City. There was the Parchment vegetable paper company founded by Jacob Kindleberger in the early part of the century, and he envisioned himself as a sort of like a Henry Ford, kind of wanting to create a community, you know, kind of, put up the plants that hire people in the neighborhoods and created Civic spaces. There's a big Park that was committed to him" (Respondent 2). "He [Kindleberger]

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built it as a modern city to provide a high-quality yet modest quality of life for those that were working in the paper mill" (5).

Many respondents established a strong sense of cultural belonging and place through their legacy in the community. Legacy was used as a form of embodied cultural capital to assert social standing, while ownership of real estate within the community was used as a form of objectified capital. "We are the second owners of a house that was built in 1937" (Respondent 1). "We moved here with our first born in 1985" (Respondent 2). Others sought to establish cultural belonging by explaining their stake in the community. "Living in the community and being as involved as I have been over the last, you know, my kids being in school and everything." (Respondent 6). Some individuals claimed that through their legacy in the community, they had a deeper understanding of the issues and associated risks. "If you've lived here more than 10 years, you know not to drink the water" (Respondent 9).

The experience of the crisis was also seen as a form of cultural capital, bonding individuals together and creating separations from outside communities. "I feel like a separation between people who have experienced this and people who haven't" (Respondent 7). "Until you are in that position, knowing that you have consumed high levels, it's not real to you in the same way" (Respondent 9). This shared experience also created connections with those in other communities who had also consumed water contaminated with PFAS.

Institutionalized capital was only lightly present in conversations. The role of agencies and organizations in recognizing actors involved in the response was discussed by a few respondents. Media recognition was seen by many as directly facilitating successful collective action, and many discussed media as elevating community actors into positions of power. "She's really been very vocal and has had a lot of media presence" (Respondent 2). "I was early on interviewed by some

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news media outlets and sort of became known for to some people for my role in the water crisis" (Respondent 7). Through media visibility activists were also able to identify and create connections with actors in other impacted communities.

Interpretation and Discussion

Key informant interviews included several themes indicating that resilience was enacted both individually and collectively. The processes described by the Communication Theory of Resilience were manifest in different ways and to different degrees.

Research question one asked, how has the community of Parchment, MI and Cooper Township enacted resilience toward the issues of PFAS contamination? The processes described by the Communication Theory of Resilience were manifest in themes present in the key informant conversations, albeit to varying degrees. Based solely on the Communication Theory of Resilience, the community of Parchment, MI and Cooper Township can be said to have generally been successful at enacting resilience, with some barriers in place.

Normalcy was crafted by creating new risk management routines, such as running tap water before using it, using bottled water and avoiding eating potentially contaminated fish. These strategies are common water contamination responses advocated by agencies managing the response. Information about risk reduction helped residents create new routines of water use. Other strategies, such as replacing lead pipes, were efforts to address other concerns about water quality and return to a state of normal water use.

While crafting normalcy was evident in the key informant interviews, it was not a dominant theme. Primarily, water contamination is generally not a visible risk factor, and the potential long-term health impacts of the event are not fully evident. The Parchment community was able to connect its water system to the greater Kalamazoo system within a matter of days, thus allowing

for a relatively rapid return to normal use patterns. In cases of longer-term contamination issues, or cases of visible water contamination, more evidence of efforts to craft normalcy might be evident. COVID-19 created a subsequent disruption of normalcy that may have overwhelmed the issue of PFAS contamination.

Maintaining and using communication networks played a central role in the enactment of resilience for Parchment and Cooper Township. These networks drew on local organizations, including churches and schools, and political organizations at local and state levels. Key respondents indicated that relationships with these organizations allow for the application of human resources, information, and material resources, including spaces for meetings. Human resources were described as emergent and used in the distribution of bottled water. Information resources were developed and distributed through town meetings, which were sites of community and political organizing and influence. The ability to hold town meetings was facilitated by local organizations providing appropriate meetings spaces. The form of meetings changes with social distancing under COVID-19, however, and may have reduced the impact of meetings. Regardless of this factor, the interviews suggest that these meetings were essential in both developing networks and in using networks to develop resources for response.

The key informant interviews included themes of identify anchoring and reaffirming. These themes manifested in three primary forms. First, key informants signaled and situated their identify in relation to the contamination. This included reference to roles such as faith leader, elected official, public health professional, activist. These roles provided some indication of both their activity in relation to the disruption and how they viewed the experience. The person who used the self-description of activist, for example, displayed more anger than those who were elected officials. Second, some respondents anchored their comments within their role as parents

either of grown children or young children. This designation was used in part to explain their response to the event. Those reporting having young children indicated a higher level on involvement perhaps out of a sense of protection. Finally, informant themes indicated and anchoring of identify as members of the community. Even though most noted that Parchment was a suburb of a larger community, they referenced the unique history and sense of place.

Alternative logics were most evident in the use of narrative sense-making to understand the crisis. Themes of responsibility were paramount- community members had to refocus and reposition narratives of community identity within the context of the crisis. Sensemaking was enacted around questions such as negotiating blame and responsibility concerning the mill and the mill owner, the Georgia-Pacific corporation, and the larger problem of corporate polluters. A second theme was associated with the failure of government to control the pollution and protect the public. These themes present alternative views of responsibility. An interesting alternative logic was evident in themes of uncertainty and health. Although lack of clarity about health effects was described as a source of anxiety, it was cited a reason for not focusing on potential health problems. A final set of themes regarding alternative logics concerned framing Parchment's contamination within other events. The fact that other communities were also suffering seemed to create a sense that commonality.

Foregrounding productive action was evident in themes from key informants but was not well represented. Themes from the interviews suggested that interviewees did not see any meaningful action that could be taken to mitigate long-term harmful effects of PFAS contamination. They had been drinking the water, in some cases for many years. The nature of PFAS as a bio-accumulate and the forever chemical was evident in themes of uncertainty and

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inevitability articulated by many respondents. Limited themes of political activism and efforts to change regulations were expressed.

Research question two asked, how has the community of Parchment and Cooper Township organized towards collective action to address the issues made salient by the discovery of PFAS contamination? A key metric of collective action is the creation and utilization of social capital. Based on the metric of social capital and general narratives of collective action, the community of Parchment, MI and Cooper Township were successful in initial response to the crisis but struggle to maintain initiative for long-term collective action. Community members reported creating and utilizing various forms of social capital in the immediate response to the crisis, but these forms of capital did not necessarily transition towards broader political advocacy and collective action. Inter-community ties seemed to be more important in facilitating long-term action.

Structural and cognitive social capital was a key component facilitating collective action in the immediate aftermath of the crisis event. Linking ties connecting local organizations and bridging ties between local, state, and federal organizations were key in the response. Bonding ties in the form of friendships and familial ties connected community members in the broader response and formed important foundations in the immediate aftermath of the crisis. In terms of cognitive social capital, trust between community actors was seen as of primary importance, as well as shared values of community care. Despite the importance of intercommunity and multi-scalar structural ties, values of care were intra-communal. Care was seen as an obligation owed to the community. This perspective of care as obligation is reinforced through cultural capital, and many respondents sought to establish cultural literacy through familiarity with local history.

Long-term collective action was facilitated primarily through inter-community bonding ties based on shared experience and commitment towards solutions, rather than structural linking

or bridging ties. A feeling of connection with activists in other communities was key to encourage respondents to continue to engage in collective action. The ability to rely on these cross-community ties to avoid burnout was seen as a particularly valuable function. A commitment to democratic engagement and a literacy with democratic processes was also seen as important for long term action. Community based values which were seen as useful in the initial response were also seen as factors interfering with long term action.

Research question three asked, how might the community of Parchment and Cooper Township improve their capacities for resilience? Drawing again from the Communication Theory of Resilience, two of the primary limitations on the enactment of resilience were the high levels of uncertainty and the inability to foreground productive action. Key informants indicated that there was simply not enough known about the health effects of PFAS for them to assess their risk. In addition, they did not know how long they have been exposed. Informants expressed a kind of fatalism and powerlessness with regard to the contamination. In other words, informants did not reflect a high degree of agency in managing the ongoing issue of contamination even though initial efforts to manage the disruption by using social capital and networks was seen as successful. One informant expressed concern about metal health impact and described a tool that had been developed to help the community with mental health issues.

Addressing the ongoing uncertainty about PFAS is important to improving resilience. Even though issue fatigue was described as a limitation, efforts should be made to keep information accessible through regular updates on clean-up of the mill site and health effects. In addition, opportunities exist for foregrounding productive action in the form of organizing for change in PFAS regulation. Another opportunity for productive action that has been unexplored in this community relates to mental health. In other communities affected by PFAS contamination, mental

health resources were made available to the community following the discovery of the issues. Mental health resources specifically related to uncertainty in the context of contamination could aid community members in backgrounding negative emotion.

Research question four asked, how might the community of Parchment and Cooper Township improve their capacities for collective action? The primary structural factor interfering with collective action is the age gap within the community. Bridging ties connecting churches in the area to school response events could have helped to overcome this gap. Values appeals motivating long term collective action need to be found which specifically target older members of the community. Health-based appeals function to disengage older community members, and appeals based on family ties to children and young people in the community seem equally ineffective. Appeals evoking the legacy of the community and the mill may be more effective. Coordinating with other communities experiencing PFAS contamination is a collective organizing activity that could reduce a sense of powerlessness and facilitate productive action. Finally, efforts to address the underlying anxiety and stress through an intentional effort around mental health may help legitimize negative emotions.

Theoretical and Practical Implications

This analysis provides additional support for the Communication Theory of Resilience through its application to a water contamination event. While not all five elements of resilience were enacted to the same degree, all were present. In particular, the ability to foreground productive action was limited by the nature of the event. Buzzanell (2010) offers an important caveat about communication and resilience, noting that these processes may vary based on the nature of the event and its relative permanence and the event structure. Some events are singular and some more cumulative in impact. Water contaminated with some chemicals may be cumulative in impact. Some kinds of events prompt immediate and active emergency management responses to aid in the response and recovery. Others do not require these kinds of immediate

intervention. In addition, the cultivation of resilience draws on narratives, stories and memories about past events to frame meaning and responses to contemporary challenges (Buzzanell, 2018). This may be especially relevant as serious disruptions converges, as with the PFAS contamination of water and the COVID-19 pandemic.

Convergent and cascading crisis events can exacerbate and transform disruptions. Low-level vulnerabilities widespread throughout a system can contribute to the emergence of new events as crises act upon the system (Federici & O'Brien, 2019). Water contamination events such as PFAS by their nature are far reaching throughout a system and are particularly positioned to contribute to and be worsened through cascading crises. Resilience frames are often longitudinal but are conventionally oriented towards singular events or issues of limited duration. For example, resilience is enacted *towards* PFAS issues in this study. Crises events are not singular, and as changing environmental conditions, aging infrastructure, and shifting population demands produce expanding conditions for convergent crises, this single-issue mode of thinking will become increasingly outdated and ineffective.

The results here also suggests that there may be opportunities to match the five inter-related processes of resilience to specific forms and aspects of disruptions. While duration of the event may be important, it is likely that the severity of the disruption is an important consideration in the way resilience is communicatively constructed. The nature of the disruption will also dictate to some degree the ability to foreground constructive action and the form of negative emotions that need to be managed. Uncertainty is an important factor in determining what actions might be productive.

The capacity of Communication Theory of Resilience to directly identify how these processes function in a particular event reveals an opportunity for further development into a contingency based theory of resilience. Contingency theories are adaptive towards the conditions of a crisis and function both descriptively and prescriptively to evaluate response. Some crises may create conditions that are more favorable to the effective enactment of some resilience processes. Three contingencies that may influence the ways resilience is communicatively enacted during crisis information availability and opportunities for productive action, levels of uncertainty, and duration of crisis. These factors will activate and influence different processes of resilience. Information availability for example will influence perceived self-efficacy and is theoretically inter-connected

with the foregrounding of productive action. Level of uncertainty is an emergent and dependent function of identity anchoring, alternative logics, and backgrounding of negative emotion.

In addition, the specific forms of communication available to a community might influence the ways resilience is communicatively enacted. In this case, the town hall meeting was especially important as a site for organizing, developing social capital and enacting resilience. The emergence of COVID-19 as a cascading crisis complicating this event creating emergent challenges to this form of organizing, necessitating a transition. The development of a contingency theory of crisis resilience would also improve the capacity of the Communication Theory of Resilience to function prescriptively in crisis contexts and would broaden this theory's capacity to inform engaged scholarship.

As the community of Parchment continues to manage the issues of PFAS contamination, the event itself can be a force in the development of social capital and collective action. Continued community organizing around PFAS in ways that are seen as constructive should continue. As was noted by one key informant, the residents now share a unique point of connection than can help bond the community.

The results of this study challenge the idea that social capital can be an effective direct metric of the conditions for collective action. In this case, strong intra-community ties which should have been necessary for sustained political advocacy were not present (Klandermans & Oegema, 1987; Diani, 1992; Pretty 2003). Instead, motivated individuals looked outside their community for the social capital they required to drive collective action. The resulting advocacy network achieved astounding success at engaging and influencing political actors. Simultaneously, a limited number of motivated individuals seeking justice were effective at organizing a class action suit, despite a lack of broad community involvement. In the case of the class action suit, the lack of community involvement was actually a strength – the community was able to continue to maintain effective relationships with PRPs while legal action was taking place. Together, these instances of collective action suggests that collective action is not simply an emergent, systems function of a community with good social capital. Instead, collective action is a deliberate process driven by motivated individuals, in some cases in defiance of limited systemic capacities for self-organization. Theoretical approaches to collective action must recognize the importance of individuals, embolden by agency, self-efficacy, and a commitment to democratically informed values of public participation, in driving collective action response to disruptive events.

Future Research and Limitations

As describe above, inter-community ties were found to be of significant importance in facilitating collective action, however, this study confined its focus specifically to the community of Parchment and Cooler Township. Future research should expand towards other affected communities, and trace linkages across communities to understand the collective action network. Continuing key informant conversations in other communities may be strengthened through the use of network analysis methods to gain a holistic picture of the structure of inter-community response.

Continued efforts to explore other kinds of disruptions are necessary to understand how residence may function in other contexts, to lay the foundation for the development of a contingency theory of communication resilience. One logical next step would be to explore disruptions that are not directly associated with human activity, such as hurricanes or earthquakes. These disruptions do not have the same opportunity to use alterative logics to assign blame. In addition, examining communities that have repeated disruptions, such as floods, might yield insights into how resilience and social capital from one event may be leveraged for another.

Another important factor to consider in subsequent inquiry is the time frame for the disruption. Some communities have been struggling with water contamination over very extended periods of time. The forms and level of resilience will likely be impacted. Issue fatigue, as indicated by informants in this case, can be a factor in reducing both resilience, social capital and collective action as community members withdraw from engaging.

Several limitations impacted this analysis. Only one event was examined at one point in time. Community members perceptions and recollections can be expected to change over time. In addition, the sample of key informants was limited by a variety of factors such as issue fatigues, COVID-19, and respondent limitations in the ability to navigate technology. COVID-19 likely

confounded these results in ways that were beyond the ability of the researcher to control. In addition, respondents for this study came from a narrow socio-economic background. All key informants evaluated in this study had some level of higher education and possessed key resources facilitating their capacities for resilience and collective action. Access to other socio-economic classes would greatly broaden this research, but this access is similarly restricted by the necessity of remote assessment.

Future research in a post-COVID context would benefit from in-person conversations and ethnographic analysis, rather than a reliance solely on remote data collection. While this is a limitation, it does point to the need to examine multiple layers of disruptions. As climate change is manifest, many communities can be expected to face simultaneous and compounding crises.

Conclusions

The community of Parchment and Cooper Township respond to the contamination of drinking water by communicatively enacting resilience and using social capital to collectively organize in response and develop and apply resources. Longer term challenges will require sustained resilience, higher levels of social capital and ongoing collective organizing. Chapter six will explicate many of the limitations, biases, and challenges that underlie and inform this work.

CHAPTER 6 - REFLECTIONS

I peer out the window as we arrive at Pickerel Lake, counting the cars in the small dirt parking lot. *One, two, three, four… too many people*. Pickerel is a small lake, and the water access point is even smaller, less of a beach than an opening carved out of the reeds. It was too crowded to socially distance.

"Sweetheart, I'm not sure about this," I say.

My partner Jamila agrees, turning the car slowly around the parking lot as we pass a rowdy group of unmasked teenagers carrying floats to the water. I grimace. We drive to Silver Lake instead, only minutes away. The crowd is larger there, but so is the beach. We weave our way past the islands of families and into the lake. Our feet kick up muck and goose poop as we wade in, the heat dissipating quickly from our bodies in the cool, familiar Michigan lake. I had been sitting inside working all day, and it feels incredible to stretch my muscles. Tomorrow we will ride our bikes along the Huron River. On the weekend, we will trek fly rods into the wilderness in a futile pursuit of trout. It is summer, 2020 – the summer of COVID-19.

Autoethnography

I came to auto-ethnography as a solution to a practical problem. After years of research design and hunting funding, the onset of the COVID-19 pandemic in March 2020 thoroughly upended my plan for an ambitious, multi-phase ethnographic study. My institution placed hard restrictions on in-person research - ethnographic work was fine, so long as it took place within the state. My work coincidentally was to take place, in person, in a small western Michigan town, located exactly equidistant between my school, in West Lafayette, IN, and my hometown of Dexter, MI. More precisely, it was 40 miles too far north, and so I was shit out of luck.

My advisors and I decided on the obvious solution, restructuring the project to be interview-based. It was a compromise that many scholars were making at the time but knowing that didn't make me feel better about the decision. To fill the humanist void left by the ethnographic project, one of my advisors suggested that I perform an auto-ethnography of the challenges of doing research during the pandemic. The guiding focus of this analysis, the research question to

be examined, would be simple. What does the experience of the pandemic reveal about doing engaged scholarship?

I agreed enthusiastically to my advisor's suggestion, as I am wont to do in any meeting with my academic mentors, but I was internally quite wary. It is not that I am a *post-positivist* who looks upon auto-ethnography as illegitimate, in fact the opposite is true. My very first undergraduate research methods class was taught by Dr. Sandra Faulkner, who taught me the value of subjectivity, narrative, and poetics in communication research. No, my hesitation was mainly a matter of training. The sole ethnography class that had been offered during my tenure at Purdue has been through the Anthropology department, and although this class positioned me well for, say, a twenty-year community-based project, self-observation was less of a focus. Still, I resolved to give auto-ethnography the proverbial college try.

Auto-ethnography, like it's *allo-* counterpart, places focus on cultural context and embraces holistic understanding through evaluation of the personal experiences, thoughts, feelings, stories, and observations of people within a culture. The key departure of auto-ethnography from other approaches to ethnographic research is in the researcher themself. While for many ethnographies the researcher will attempt to immerse themselves within a culture to reduce observation effects, in auto-ethnography, the researcher is *themselves* the primary participant/subject of the research. The conventional qualitative line of limiting researcher subjectivity is abandoned. The lived experiences of the researcher are expanded, interrogated, and contextualized through a process of reflection and observation, and are made the primary unit of analysis for the research.

Deborah Reed-Danahay (1997) identified the seeming paradox in the pluralistic meaning of auto-ethnography. Auto-ethnography refers in general to an ethnography of one's own culture, which in practice should involve and include one's own group. In application, however, the term

most commonly refers to autobiographical writing that has ethnographic relevance. That is to say, autobiographical writing that provides insight into complexes of historically situated and socially constructed identity. While seemingly contradictory, well-done auto-ethnographies can serve both roles, providing insight into the individual researcher and their culture. Auto-ethnography as a method connects "the autobiographical and personal to the cultural, social, and political" (Ellis, 2000, p. xix), and in so doing transcends the recorded experiences of the individual researcher/subject, speaking truly and holistically for/of the culture. The ethnographic gaze is simultaneously turned inwards towards the self, while maintaining an outward understanding so as to position the self within larger context (Denzin, 1997).

How though is this transcendence achieved? Of foremost importance is an investment in the politics of positionality (Madison, 2005). Positionality refers to the world view assumed by a researcher, as well as the position they assume in relation to a specific research project (Foote & Bartell, 2012). Traditionally, the researcher's position can be discovered by their location in relation to three aspects of a research project: the subject, the participants, and the research context (Savin-Baden & Howell Major 2013). Positionality within an auto-ethnography is more challenging, as the researcher *is* the subject and participant, and the researcher exists within the context. Thus, positionality within auto-ethnography becomes more of a question of asserting researcher identity. This core feature of auto-ethnographic work can better be articulated as *reflexivity* – the careful consideration of the researcher's self within the overall structure of research design (Ellingson, 2008). Within auto-ethnographic work, more so even than in traditional ethnography, reflexivity is of foremost importance.

Effective auto-ethnography requires careful and creative choices in the representation of the research. The act of doing auto-ethnographic writing is itself a key part of the auto-

ethnographic process, inviting researcher/subject to engage in critical self-reflection. Attempting to accurately record an experience to draw out ethnographic relevance invites unique critical insights into the experience itself, recontextualize, reconstructing, and transforming the experience of the subject into cultural insight.

The academic writing that I have been taught is the traditional research report, grounded in positivism and built around a core idea of reducing subjectivity. This style of writing is wholly unsuited for auto-ethnographic work. Karen L. Ashcraft and Angela Tretheway, editors of a special edition of the *Journal of Applied Communication* examining auto-ethnography, explain "traditional forms of scholarly representation function to erase the contradictions of emotion and work'' (2004, p. 179). Yet, creative forms such as poetics, performance, and short story, are already developed tools that are adept at capturing personal and the subjective elements. Through the use of these forms auto-ethnographers not only succeed in communicating subjective experience, but also in challenging conventions of form that place barriers towards their work. The embrace of these forms has led to the emergence of entirely new research forms, or Creative analytic practices, which synergistically combine rigorous data analysis and creative representation (Richardson, 2005).

There are additional challenges that go along with using these forms in research. In her *Poetic Inquiry*, Sandra Faulkner establishes that arts-based researchers must master the dialectic between aesthetics and epistemics. The work – in this case, auto-ethnographic writing – must function both as art and as research. An auto-ethnographer who chooses to utilize short story must produce work that stands on its own from a literary perspective, while simultaneously clearly communicating scientific insights.

All of this confirms what I had initially suspected when this project was proposed to me – that auto-ethnography is a complex and challenging undertaking for a student untrained in either self-observation or artistic forms like creative writing. Yet, circumstances have thrust the role of auto-ethnographer onto me, and I must rise to the challenge. I ask the readers to have patience with my awkward prose and meandering style. As the literature directs, I will begin before the beginning, and try to establish a backdrop against which I can paint my identity.

Me-chigan

I am affluent, white, cis-gendered, third generation college educated, male, in a heterosexual relationship, land-owning, the child of two teachers, and the son of a prominent crisis communication researcher. I am the beneficiary of immense personal privilege both in American culture in general and within my chosen profession of communication research. I was born approximately 29 years ago in a hospital just outside of Detroit, and I have lived most of my life in Southeast Michigan. I grew up in the Huron river watershed, drinking water from a well system 3.4 miles away from a site where, in 2018, a PFOS bloom would be identified.

> "There's treasure in the stream!" my sister hollered, beckoning me to follow her.
>
> We eagerly tramped our way through the bramble of ivy and ferns, taking special care to avoid pricker bushes and nettles. The banks of Terabithia were tall and difficult to navigate to a five-year old boy and his big sister. The grass and gnarled trees were like another world. We left our sandwiches in a crook of a tree in the Secret Garden – our name for my sister's private reading nook - and plunged into the cool, clean water of the creek. We waded up against the flow of the water, picking pieces of glass and pottery from the rocks. Crawdad skittered from our feet as we made our way towards the culvert, massive semi-trucks and cars thundering overhead.

In my childhood, my sister and I would play along the banks of a small creek that formed the border of our yard, which we fancifully called *Terabithia* after the imaginary kingdom in Katherine Paterson's 1977 children's novel. The creek branched from the Huron River, the portion

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in our back yard flowed from a culvert under a busy road. We would occasionally find bits of broken pottery and glass in the water, rounded into the shape of stones. I would amuse myself by erecting dams along the creek's path and watching the water find its way around the obstacles. Across a bridge made of three two-by-fours laid on their side was my friend Laurel's house, and more often than not Laurel's best friend Jamila would be there playing. To Laurel and Jamila, *Terabithia* was known as *The Gully*, and the creek carried for them a different magic than for my sister and myself.

Whenever his work would allow it, my father would take us all fishing. One of my earliest memories is of holding a plastic children's fishing rod, with a reel fashioned to look like Mickey Mouse. Throughout my childhood, I would often fish the waters in the immediate area surrounding my home, pulling muscled channel catfish out of Huron River, slow-moving carp out of Silver Lake, and bluegill out of almost every pond and lake I could find - Pickerel Lake, Perch Lake, Lucy Lake. When I was fifteen, I got my first fly rod. During the subsequent summers and falls, I would spend most evenings standing knee deep in the Huron River, catching brown trout and small mouth bass that came to feast on the annual mayfly hatch.

When I was 18, my town began to develop Mill Creek, a small branch of the Huron River that meandered its way through our village. At the time, Mill Creek was a tired and smelly trickle compared to other waterways in the area. The creek had been damned decades ago and the result was a shallow, weedy swamp in the heart of our downtown. The town removed the dam to improve and expand a downtown park, with the creek as a water feature. I had the opportunity to help Dr. Donna Kashian, a professor of environmental studies at Wayne State University and my father's colleague, perform an assessment of the river. She discovered drastically low oxygen levels and a practically non-existent insect population – she told me it would be years before there was enough

insect life to support a healthy fish population. She was right – five years later, I pulled a beautiful 14-inch brown trout from the river on a single cast with a caddis fly.

Water everywhere

I left Michigan and attended Bowling Green State University, pursuing classes in communication and philosophy. I learned research methods from Dr. Sandra Faulkner, rhetoric from Dr. Kate Magsamen-Conrad, and Persuasion from Dr. Lisa Hanasono. Dr. Hanasono took me under her wing as an undergraduate research assistant, and soon I was well on my way to a career in Communication research. I loved Bowling Green and made some excellent friends there. In the summer, we would swim in an abandoned quarry that had been allowed to flood. Signs around the area warned swimmers against putting their heads under water due to contamination of sediment, but no one ever heeded those warnings. I would dive deep and surface with eyes clouded with whatever was in that water, with muck and gravel caked in my hair, though the water appeared relatively clear on first glance.

In 2014, the year before my graduation, routine testing in the city of Toledo, Ohio, showed heightened levels of the toxin microcystin produced by the cyanobacteria, which had multiplied at a high level in Lake Erie due to fertilizer runoff. Living twenty minutes south of the crisis, I witnessed the fallout. The city responded quickly, and after a few days without water the immediate crisis was over. A few people's pets died, but there were no other serious health affects identified. I wrote my first published paper about the city's handling of the crisis, taking special note of the effective role of Mayor D. Michael Collins. My Masters' thesis would later trace the long-term impacts of this event on agricultural practices in the area.

In 2014, a few months after the Toledo water crisis, the Flint Municipal Water Department changed its water source from the treated water of the Detroit Water and Sewerage Department to

the untreated water of the Flint River. Residents of Flint, Michigan began sending messages on social media depicting discolored water and reporting a foul taste and odor to municipal water only weeks after the switch occurred. Local and state governments did not publicly acknowledge the problem until a year after these messages began to emerge. In the second-year of my Ph.D., I learned through a text mining analysis of governmental emails surrounding the crisis that state actors knew almost immediately about the problem.

As is now well-known, the water of the Flint River was very corrosive and the municipal water pipes were not treated with anti-corrosion chemicals. The water quickly stripped-away protective sedimentary layer of the city's piping. The water directly contacted iron and lead pipes, leading to a variety of serious contamination problems. The result was an exploding and cascading crisis that affects the residents of Flint to this day. Flint changed the way people in Michigan talk about water and the ways government agencies responded to contamination.

Against the backdrop of these two events, of vastly different scale and substance but joined by familiar themes, I entered into my graduate studies in Communication.

Who am I supposed to be today? The 21st century graduate student-teacher-scholar-writer-intellectual-activist

The very first piece of advice that was given to me when I entered graduate school was to treat it as a marathon, not a sprint. That is to say, I should pace myself and conserve my energy, keeping a clear vision of how long I had to keep moving until I reached my goal. Graduate school in the 21st century is a curious space, one which demands its occupants wear many hats and negotiate conflicting expectations. Thus, it is perhaps not as accurate to say that graduate school is a marathon as it is a *triathlon*, where in the student must not only run but excel at many separate

events in tandem to achieve success. To succeed in graduate school, one must not just be a skilled student, but a teacher, scholar, writer, intellectual, and activist.

The second piece of advice I received when I entered graduate school, was that my first job was to be a student. It was certainly a difficult job. Ninety percent of my courses were seminar based, which while more social and intellectually engaging than other course-delivery formats and consume significantly more emotional and intellectual resources. Implicit in the statement that being a student was my *first* job is that it was not my *only* job. Of course, I also had responsibilities to teach, do independent research, publish, attend conferences, and pursue funding.

Despite apparently being my second job, teaching is the activity that consumed most of my time. Prior to each semester I made a bid for a particular class I was interested in teaching - public speaking, organizational communication, public relations, etc. If the course director liked me and felt I was a good fit, I would get to teach. It's hard to adapt to different classes each semester, but it is important to teach as great a variety of courses as possible. Each course required I familiarize myself with different textbooks, write and prepare different lectures, and design different activities. I had fun with it, which was unfortunate, because every second I spent on teaching was time taken away from research and scholarship. When I came to Purdue, a professor had warned me of this problem:

> You'll want to help students, to devote your time to them, to be an advocate for them. And that's a good thing to want that. But I'm just telling you… you won't be rewarded for it. If anything it will hurt you, particularly if you get a reputation as a troublemaker.

I wrote my undergraduate senior thesis on *The Child and the Curriculum* by John Dewey. Dewey paints a troubling picture of institutional education as alienating, abstracting, and damaging for the student. He then places the burden of combatting this problem on the individual teacher.

When I became a teacher, I vowed to embody Dewey's approach in my classroom. I didn't anticipate how difficult the structures of education would make this task.

It is easy to teach poorly, and the system doesn't give you very many incentives not to. It is expected that graduate students will spend the majority of their time on schoolwork, with as few hours as possible turned over towards grading and lecturing. Long-hours spent on creative course planning is not part of the equation. It is easiest to simply read off of pre-made slides inherited from some other instructor, pass out multiple choice exams twice a semester, and give out high grades to avoid student complaints. The kind of learner-centered pedagogy Dewey preached, where courses are adapted and shaped around the needs and interests of the student, is next to impossible in contemporary university education.

Subsuming teaching and schoolwork is the mercurial identity category of the 'scholar'. Scholarship is a systematic approach to a particular area of knowledge. Scholarship typically consists of three primary activities: *research,* rigorous and systematic inquiry by which knowledge is discovered and created; *teaching*, imparting knowledge about a subject to students; and *service*, practical application of scholarly knowledge and research principles to solve problems and seek solutions (Lee, 2009). Traditionally these activities were understood as interrelated elements of an integrated linear process. Research creates knowledge, which then can be taught to students and applied within practical contexts. A better piece of advice to offer starting graduate students, perhaps, would be "your first job is to be a scholar." Although less immediately understandable, this statement would at least more honestly reflect the identity demands placed upon the graduate student.

The ultimate proof of scholarship is the dissertation.

"You must write the thesis that you are able to write" writes Umberto Eco in his *How to Write a Thesis* (1977), a book which was gifted to me by a friend upon entering my Ph.D. On the cover Dr. Eco is pictured pompously puffing a corncob pipe in front of a typewriter, the very image of a 20th century Italian intellectual figure. Eco's advice is practical and patronizing in equal measure, but most useful are his constant warnings against pride.

In the conclusion of the book, he lays out the expectations for a dissertation, what he defines in gendered terms as "a piece of original research through which the candidate must demonstrate his scholarly capacity of furthering his discipline." The dissertation, asserts Eco, must be interesting, practical, specific, say things about a subject that have not been said before, and be useful to others. Because of the difficulty in achieving these criteria most dissertations are completed by people in their 40s or 50s, continues Eco, and there are remarkably few young Ph.Ds. The end result of this heroic effort should be a document roughly 100 pages, triple spaced, including bibliography, appendices, tables, and titles, suitable perhaps for publication as a chapter in a larger collection.

Compared to historical standards, Eco's expectations seem unusually rigorous. Nobel Laureate John Nash's Ph.D. thesis, submitted to his committee at Princeton in 1950, was a grand 28 pages long including bibliography and acknowledgements, and in conformity with Eco's prescriptions, was triple spaced and professionally typed.

Nash's document is mammoth however in comparison to the dissertation of Gottfried Schutz, whose work surfaced online recently and dominated the social media discourse of my Ph.D. cohort. Schutz's dissertation published in 1780 consisted of eight pages, single spaced with three-inch margins. Unfortunately, my two semesters of undergraduate German did not equip me to read the document with any comprehension, but it is difficult to see how in those pages he could

possibly have met Eco's prescribed criteria of being interesting, practical, specific, novel, and useful.

It is of course meaningless to judge the rigor of scholarship by the mere number of pages written, however, it is meaningful to observe how the expectations of doctoral work have shifted and changed throughout the previous centuries. Matthew Barton, in a 205-page document submitted in partial fulfillment of a degree of philosophy in English at the University of South Florida in 2005, provides a fascinating history of the dissertation as an academic tradition.

The medieval ancestor of the dissertation, writes Barton, was in fact an oral recitation, the first lecture by a master of canonical texts towards an audience of other learned individuals. The creation of the printing press and the development of reliable mail systems ushered in the emergence of the academic journal, and with it, pressure from universities to fill those journals' pages. The oral systems of the past collapsed in less than half a century, and more and more universities around the world began to adopt the German model of requiring graduating students to write a laboratory report prior to graduation.

The modern dissertation, Barton continues, emerged throughout the 20th century as a product of market forces and the tyranny of scientific empiricist methods in academia. Today, expectations are for a book-length original work that makes a substantive scientific contribution, suitable for sale through private commercial publishers, or at minimum for publication in the form of several separate articles through closed-access journals. The expectation may not track with traditional conceptions of scholarship, but it directly meets the needs of an industry built around the mass production of intellectual commodities. Scientific publishing is a massively profitable business, with some publishers reporting profit margins higher than Apple, Google, or Amazon "under conditions where authors generate the product (no cost to the publisher) and pay open-

access fees, reviewers peer review the paper for free (no cost to the journal), and readers/institutions pay to access non-open-access articles" (Alwine et al. 2021, n.p.). Prior to defense, most prospective doctoral graduates are warned that they will be asked by their committee to establish a plan for publication, including identifying several potential venues for their work. An unpublished dissertation consigned to backlogs of university libraries is considered failed scholarship, despite the ready availability of these ideas to others in the scholarly community (Barton, 2005).

The necessity for a dissertation to be publishable also creates pressures for uniformity. Most universities have very strict guidelines dictating font size, page length, margin size, and in some cases even chapter and argument structure. These guidelines ensure that dissertations can regularly be turned over into journals, and no student wastes their time with something unpublishable. Of course, all of this is warranted within modern academia, where judgments about job qualifications, promotion, tenure, grant eligibility, and general inclusion in the community will solely hinge upon a scholar's publication record.

"Henry, is Chapter three... *creative*?"

The question made me wince. Jamila had just finished reading the draft of my dissertation for the first time. In the first chapter, I talked a big game about challenging academic form, but when the time came to stretch my creative muscles in the third chapter I had only mustered an awkward collection of stories punctuated with narrative theory. It was somewhere between a conventional academic case study and college freshman prose.

"Yeah," I said weakly, "It's creative for me."

"It's just, you know how much you wrote on Crystallization, and I was so ready for something really weird. Where's the weird?"

I had considered writing the stories in a journalistic style, even going so far as to mock up a newspaper-like format for the stories in Chapter three. I had planned to ape the structures of small town newspapers with quippy titles and had even roughly sketched a three panel cartoon. Before long however I had decided it was more trouble than it was worth. Upon submission the newspaper-look would vanish with

Purdue's stringent formatting. *More importantly, what would I do with it afterwards?* I sent Jamila the old mock-up.

"This is good!" she declared. I shook my head.

The express goal of these many years of study, teaching, researching, and writing, is to transform the student-teacher-scholar-writer into *the intellectual* - a noble figure devoted to the work of the mind, which is like a scholar, but different. Gramsci (1971) identified two general forms of intellectual, the traditional intellectual such as a teacher or priest whose function is simply to reproduce intellectualism into the next generation, and the organic or practical intellectual, whose function was to be used in the reproduction of power, such as the technician, lawyer, or public relations expert. Neither form, in Gramsci's evaluation, is particularly laudable. Traditional intellectualism is mere indulgence by the elite, the masturbatory urge towards intellect for intellect's sake. Upton Sinclair (1923), in *The Goose-Step: A Study of American Education*, characterizes this form of intellectualism thusly:

> Slaves in Boston's great department store, in which Harvard University owns twenty-five hundred shares of stock, be reconciled to your long hours and low wages and sentence to die of tuberculosis—because upon the wealth of what you produce some learned person has prepared for mankind full data on "The strong Verb in Chaucer" (90)

For Gramsci, the organic intellectual is far more evil. The ineffectual traditional intellectual is resigned to the ivory tower and at worst parasitic, while the organic intellectual is in the field, armed with whip and chain, creating and reinforcing structures of power to keep the masses in line. The archetypes of this form are the seminal 'fathers' of organizational communication that I dutifully memorialize to my undergraduate students each semester – men like Barnum, Bernays, Lee, Page, Taylor, Chatelier, and Ford, fascists all, who bent their mean intellects towards the subjugation of humanity. The 'sciences' of public relations, of scientific management, of

efficiency, which for generations have shaped and structured my field of study, are among the finest shining examples of Gramsci's organic intellectualism.

Despite the evil heritage of public relations and organizational communication, it is not so easy to completely reproduce Gramsci's critique of the organic intellectual to contemporary communication academia. In fact, many of the leading contemporary thinkers in my field act in a way that is at least nominally in service to the critical project.

Engaged, transformative, and applied paradigms of research all serve to redefine and reposition intellectual work in direct service to marginalized people and challenge the harmful operations of power. The *scholar-as-activist* interrupts and interferes with structures of power as they exist within and between academia and other global and civil institutions (Dutta, 2019). To effectively function as in this role, scholars must make the interruption of power a central axiology of their scholarly work. This involves an examination of academia itself as a locus of power and a key site for interrogation.

Scholars, in doing their role within academia, construct barriers between themselves and communities. Like all intellectuals, scholars cannot exist as autonomous figures – they are dependent on, beholden to, and necessarily constrained by the institutions that pay their salary, provide access to resources, and facilitate connections to their intellectual community (Said, 1994). This is particularly true for scholars doing engaged, transformative, and applied work. As highlighted by Barbour et al. (2017), engaged scholarship requires large investments of time, spent strategically to develop relationships and generate research design likely to produce insightful and relevant results. Engaged scholarship requires the building of relationship through organization and structuration, a process that requires time, funding, and organizational cooperation

(Connaughton et al., 2018). Scholars who act without due consideration of the institutions they depend upon can quickly find themselves cut-off (See Salaita, 2015).

Institutional support for engaged scholarship does exist in some forms (Carragee & Frey, 2016). Unfortunately, this support is for the most part ornamental and devoid of political urgency. Celia Rodriquez's (2018) describes the vacuous incentive structure for engaged work in her *Decolonizing Academia* thusly:

> You, too, could add two lines to your cv by speaking about the new social movement and their radical strategies to dismantle the system. You, too, can participate in academic dialogues about poverty and labour rights as you pass by an undocumented cleaner who will make your bed while you go to the main conference room to talk about her struggles. (33)

The creation of incentivizing structures for engaged scholarship may pressure graduate students to do performatively engaged work without sufficient structures of support. When I entered my Ph.D. program, I was cynical about the value of communication research. Seeing my advisors and mentors find success and secure funding while following this paradigm was inspiring. Engaged approaches present an attractive solution to the inherent values conflict of intellectualism. I can do research, get published, pursue a conventional academic path, *and* my work can have relevance and direct impact on a real-world community in need? Sign me up! Never mind that the added burdens of time, finance, labor, and lack of strong institutional support are doubly burdensome to an unestablished, geographically bound researcher working on a fixed timeline and dividing their labor between research, studying, teaching, serving, and writing.

> POP…POP…POPPOP…POPPOPPOPPOPPOP

> I tossed the popcorn in the bowl with a liberal helping of butter and salt. Next, I filled two pint glasses with cold water and went to join Jamila on the couch. It was Friday night in the first year of my Ph.D., and we were watching *Mines and Maras: The Human Cost of Gold in El Salvador*, on recommendation from my advisor. My advisor came to me weeks earlier with the exciting idea of doing my dissertation on water rights activism in El Salvador. I don't speak a word of Spanish and knew next to nothing about the region, but I was thrilled. It was my dream

project – to help people with water issues. I passed Jamila the popcorn and reached to my computer, tapping the space bar to start the documentary.

"In June of 2009, Marcelo Rivera went missing in a rural area of El Salvador controlled by maras (gangs)"

Over the next twenty-five minutes we learned of the activists, teachers, journalists, and organizers who had been brutally murdered for advocating for their water rights. We were shocked that the official stance of the Salvadorian government was denial of water rights abuses, and appalled by Pacific Rim, one company in a sinister line up of profit-hungry American and Canadian goliaths responsible for the contamination of water throughout the country. We saw brutal images of mercenary groups, a fleeting snapshot of the terror inflicted against activists who stood up for water rights. The film showed at length the site where Marcela Rivera was killed, focusing on several concrete out-buildings covered in graffitied threats to anyone who might make the mistake of investigating Marcela's death. It also showed where Marcela's body was later discovered – in a narrow hand dug well. By the end of the documentary, my excitement about the research was accompanied by a new and nervous pit in my stomach. The popcorn and water were untouched.

Leaving scholarly activism for a moment and returning to Gramsci's conception of the traditional and organic intellectual, it is undeniable that these categorizations are no longer meaningful. Many researchers practice in industry and do no service towards traditional intellectualism, and in the arts and the philosophies and the literatures there are purist scholars who swirl brandy and pontificate on meaningless intellectual questions, but in general the contemporary intellectual is expected to serve both roles. For decades now, I have observed my father pursue his plan of research while also doing direct service to his department, consulting with industry and government agencies, working with local community groups, and teaching and working with students. Although juggling these demands has cost him no small amount of fishing time, he manages these various roles. I see my advisors and mentors caught within these same pressures – teaching classes, working directly with students, pursuing grants, doing field work, writing, working in administration, attending conferences, and (somehow) managing to sleep and eat with enough frequency not to keel over and die. Contemporary academia demands a hybrid

intellectualism, one which creates knowledge, reproduces it, *and* applies it. It is a high-wire balancing act.

It is not news to the readers of this document that the expectations of the *student-teacher-scholar-writer-intellectual-activist* are immense. My committee does not consist of a rabble of grey-haired old men who etched their dissertations in stone in the distant yester-years, but it consists of brilliant and practical minded women with a firm understanding of the state of the world and their fields of work. My point in this is not to bemoan how difficult it has become to be a grad student, but to illustrate that the fundamental point of the Ph.D. is not solely to produce research, but to demonstrate an ability to negotiate identity demands of contemporary academic life. Leaving graduate school, the contemporary intellectual must be equipped to continue to learn, teach, secure funding, conduct research, write reports, and engage critically and actively with their community, *without the guiding structure and support of the graduate school environment*. If the shifting expectations of academia have made it difficult for graduate students, they have made it doubly difficult for professors and researchers outside of school.

However, with the structure of graduate school being a triathlon and not a sprint, the key factors are your capacity to practice your events, plan ahead, and pace your route to ensure that you can make it to the end. This becomes difficult when an additional event is added during the final leg.

COVID-19

> The March 5, 2020 *Tampa Bay Times* headline read "Unacceptable: Woman on Tampa Flight with Coronavirus Patient Blasts Florida Officials." The next day I would fly to Tampa to attend the International Risk and Communication Conference, which my father and I had dutifully attended together every year since 2015. I texted the article to my parents.

My mother: I am sure this is really unsettling especially since you will be flying... but honestly... it's everywhere... we are MOST likely to be exposed and not exhibit symptoms... time to be careful but this toothpaste is already out of the tube… IMO

My father: yes to all that and yes you are free not to go.

Me: i wasn't saying i didnt want to go. just sending an article

My father: I understand. Just saying that everyone needs to make their own choices.

Naturally, I went, of my own choosing. It was the strangest conference of my life. Hundreds of crisis communication scholars and practitioners from around the world threw caution to the wind, traveling to Florida at the onset of the pandemic. On day one people were cracking jokes about it, bumping elbows instead of shaking hands and laughing about how foolish we were. Within days the news got much worse, and no one was laughing anymore. I will always remember my flight home on a nearly empty flight, putting hand sanitizer on everything around me and glaring daggers at the other passengers. That was before we knew about masks, or social distancing, or anything.

The pandemic did not go away, it merely accelerated. My university canceled in-person attendance, requiring those of us teaching classes to immediately transition and adapt our course delivery methods. Conferences canceled, grocery stores were mobbed for supplies, and non-essential businesses shut down by government order. It would be over a year later when a vaccine would become available to me – as I type these words in April, 2021, I have just received my second dose.

Coronavirus, or COVID-19, placed significant demands on each of the six identity categories I had shouldered during my tenure as a graduate scholar. As a teacher, I had to completely re-adapt and relearn all of the skills I had spent the last six years learning. Gone were my lesson plans carefully constructed around group activities, and the perfectly timed jokes and bits of physical comedy I had developed to engage my students. Abandoned were my schemes and

strategies to bring students up in front of the class, and other techniques to break down the spatial

separation between teacher and student. In 2021, teaching is virtual and asynchronous. Students

take your class from every country and from every time zone, many dealing with a difficult home

life and balancing their own pandemic-related challenges. In the first month of COVID-19 I had

invested money from my own pocket in an expensive new microphone, hastily purchased after

students complained of not being able to hear my lectures. Since then I have spent money on an

expensive camera and face light, and a new video card and RAM for my computer to help deal

with the burden of processing all of the video files I was producing each day for my students. The

grading burden also increased. When class is asynchronous, you cannot rely on rich, in-person

cues to tell you when someone is participating or following material. You must resort to discussion

forums, reading quizzes, and a thousand other minute tasks that wear down the resilience of the

student and the teacher.

> "Hello! Can you hear me now?"

> It was my fourth attempt over three days to complete an assignment with one of my students in *Interviewing: Principles and Practices*. That summer was my first time teaching the class, and my first time ever teaching asynchronously. Each day, I recorded a lecture and posted it online, and once a week I completed an interview with a student remotely.

> "Um, not really, but it's okay." I could hear the student on the other end was close to tears. This assignment was meant to be a face-to-face interview, to develop students' ability to react to context cues, body language, and facial expressions. The student's unstable internet connection couldn't manage a video call, so after a few attempts we settled on a phone call.

> "Let's try going forward, and if it's too big an issue we can try something else." I looked down at my script. "Hello! Thank you so much for having me in for an interview today, I'm really excited for the position!"

> Behind me, my 10-year-old PC whined with the strain of compiling a 20-minute video lecture. I'd recorded the lecture 5 hours previously, but my failing video card could barely manage the task of processing the file. I needed a new one to keep up with the burden of remote teaching, but there were few available due to supply chains being shut down from the pandemic.

Even more destabilizing than teaching; however, was the impact of the pandemic on my research. This was not the first time my plans had been thrown off by forces beyond my control. My original dissertation plan, schemed over countless meetings in my advisor's office in my first year in graduate school, was an ethnographic investigation into collective action for water rights in El Salvador. Shortly after identifying my research area and devising the research design, the Trump administration withdrew economic support for El Salvador, began mass deportation of Salvadoran immigrants living in Temporary Protected Status in the United States, and blocked Salvadoran asylum seekers from entering the country. These decisions understandably angered the people of El Salvador, and the changing geo-political context made my research plan too dangerous to continue. I took the existing, community-based research design and pivoted to a context closer to home – the emerging PFAS crisis in Western Michigan. The timing was perfect, I specialize in water-related crisis communication, and here was this brand-new contamination event in my backyard! It was as if Georgia Pacific had poisoned the water just for me.

> As I pulled into the parking lot at Parchment High School, the sun was low in the sky. I was a few minutes early for the town meeting, but nonetheless I got out of my car immediately and headed for the front doors. The drive from Purdue had taken me two hours along meandering country roads. *If this is my dissertation, I've gotta get used to that drive.* A teenager over-eagerly held the door for me and the cadre of scientists from the Department of Environmental Quality that had arrived at the same time.

> I sat in the back of the audience and listened to people yell about blood tests. Behind me, an older couple worried to each other about their water bill. The room was filled with other murmurings. The room filled with frustration, and the meeting was long.

> I later learned that 3M, the chemical manufacturer partially responsible for the contamination, had sent agents to sit in the audience and take notes of how blame was being constructed within the community. If I had looked I wouldn't have spotted the observers, and I doubt anyone in the audience at the time knew the strangers were from 3M. I was also an observer, an outsider to the community and the issues, there to capitalize on what was happening. I wasn't even in the official capacity of a researcher yet- I was just there to watch, like an onlooker slowing down to get a good view of a car accident.

When I exited the school, this time pushing the doors open myself, the sky was dark. I was happy at the prospect of my next research project. I couldn't wait until I would be there in an official research capacity and I could finally introduce myself to make connections in the community.

PFAS was an exciting, emerging issue, and I attacked the task of reworking my dissertation with vigor. For a year and a half I worked the problem, attending meetings, designing procedures for intervention, and chasing funding. I had secured resources and devised a research plan for a year of ethnographic engaged work in the community, when the pandemic struck.

In response to the pandemic, Purdue University placed hard restrictions on human subject research. All research protocols were required to be updated to reflect awareness, understanding, and implementation of COVID-19 control and prevention standards. Human subject research that took place face-to-face and off campus was subject to increased scrutiny. Finally, face-to-face research that examined participant populations that lived outside of the state of Indiana were postponed indefinitely. This was an immediate problem for me. I would have to adapt my design, refocus my prospectus, and submit a brand-new IRB protocol. Hardest of all, I had to find a way to meet my ambitious axiological goals through a remote research design.

From the beginning, I had been committed to using an engaged approach in my dissertation research. As I experimented with various designs, I agonized over the realization that the activist research I dreamed about may not be possible. With that realization came guilt and self-doubt – was my research just the kind of exploitative, voyeuristic project I had critiqued my entire tenure in graduate scholarship? In the end, would I cut-and-run from the engaged paradigm because of pressures of a deadline and the trials of the pandemic?

I wasn't alone. From afar, I watched my peers in my cohort stumble and fall in their research designs. They picked themselves up again, but it was difficult. In the previous years we had leaned on each other heavily for support. Seeing each other in classes, talking in our offices,

meeting for drinks and games over the weekend, all of these little group behaviors bonded us as a group and solidified a network of support around us. I was accustomed to talking through my design woes with my friends. During COVID-19 however, these networks fell away.

My capacity to lean on my advisors and mentors was also diminished. This is not to say that my advisors were not supportive. We spoke regularly over the phone and Zoom (an emergent remote communication technology, unheard of before the pandemic, which now is a ubiquitous household name). These conversations were helpful to keep me on track. In seeking emotional support, however, there is a richness of data in face-to-face communication which is important. In maintaining personal resilience and drive towards research, there is something about being in a space, surrounded by your peers and mentors, that is important. These things are intangible, and they are lost during a pandemic.

All the while, I was designing and teaching new classes, doing service for my organizations and associations, attending conferences, and dealing with the day-to-day tasks of surviving a pandemic. Of course, I was also doing all these things in completely new ways. Everything that had been tacit now became active. I had to think carefully whenever I came or went from the house, taking careful note of the things that I touched. Grocery shopping became a two-day affair – placing the online order, picking it up, taking it home, and carefully disinfecting everything before it came into the house. I was cooking every meal while thinking longingly of the small Mexican restaurant down the street whose take-out burritos had seen me through every final of the past four years. I was doing laundry every other day, as any clothes I wore near other people were no longer safe. Perhaps I was overly cautious, but I had people in my life who I loved and who I could not risk killing. The basic tasks of living became an all-consuming chore.

The fear, also, was ever-present. The summer of COVID-19 was also the summer when the police killings of George Floyd, Breonna Taylor, and hundreds of others precipitated a mass revolt against police violence and white supremacy. It was the summer when fascists in my home state of Michigan marched to the state capital to protest stay at home orders. The same summer, the FBI uncovered a conspiracy to kidnap the governor, plotted by a small fascist group headquartered a stones' throw from my hometown. One of the conspirators had gone to my high school. I watched as friends braver than me attended protests across the country to end the police killing of Black Americans, pandemic be damned. I felt sick at my cowardice. I would see protestors clash with militant police every night on the television, and each day I would wake up and see a new video or article reporting on some fresh atrocity or act of hate-fueled violence. Wildfires engulfed the west coast. Meanwhile the death toll from the pandemic rose steadily higher, higher, higher. I felt quite strongly that the world was ending.

My dissertation progressed at a snail's pace. I would make forward progress here and there, whenever I could steal time away from my myriad of other tasks. Slowly, but surely, I moved forward towards the goal – *graduate. Finish the degree*. It felt so meaningless. When the streets burn and hospitals turn the dying away at the door, what value is a degree? If I get sick tomorrow, or my mother or my father or my fiancée or my sister or my niece, will it matter that I got one page closer to a draft, one revision closer to Institutional Review Board approval?

Doing the Work

Eventually, impossibly, I got Institutional Review Board approval for my many-times revised protocol in March, 2021. The interviews could begin. I posted widely across social media. I emailed every organization and individual I could find information for. Reponses trickled in slowly. The people of my target community seemed to have moved-on from the issue, even though

the issue had not moved-on from them. I found people, who a year ago had been fiery and passionate about water rights, disinterested in talking about the issue. COVID-19, and the trials of their day-to-day life, had taken priority. Those who did show interest in talking to me, weren't interested in jumping through the hoops of remote data collection. Overwhelmingly my conversations with potential participants looked like this:

Person: Hello, I am interested in being interviewed.

Me: Wonderful! I have a quick consent form you will need to sign and we can set up a phone call!

[no response]

Or in one case,

Person: Hey, me and my buddies who work at [shop] would love to talk to you. We all live in the area and we've all had health problems from PFAS. Swing by [address] anytime and we can chat.

Me: I'd love to talk to all of you, but unfortunately due to COVID-19 I have to do interviews remotely. Can I send you a consent form to sign, and then we can set up a phone call?

[no response]

As I began my conversations, I received news that removed one subset of my worries and added a great deal more. I had been offered a post-doctoral position at Purdue – to begin in June. I cried when I got the news. For four years, Jamila and I had dreamed of the day I would finish my degree and we could be in a relationship that was not long distance. I had been applying to local colleges around Michigan, hoping steadfastly to find a job close by her. However, given the devastated academic job market during the pandemic, and due to the amazing nature of this opportunity, it was not one I could afford to pass up.

The position came with another serious problem however – the dissertation. A starting position in June put me on a significantly reduced timeline to complete my work. After talking

through the problem with my advisors, we agreed on a solution – revise the project, cut the second half entirely, and instead bolster the remaining sections. I would pour myself into interviews (with what few people would even agree to talk to me) and devote my whole energy to my dissertation (in addition to teaching, serving as a teaching assistant, doing service towards my fellowship and other associations, and dealing with everything else life chose to throw at me).

> "Is there any reason you can think of that you would be unfit to serve on this jury?" the black-suited attorney said in a voice sounding like she was reading from a script.
>
> "Well, I have four days to finish grading for two classes and one week to finish a dissertation that's supposed to be the culmination of my life's work. I've barely slept in days, we are in the second year of a deadly pandemic," I paused blinking hopefully before remembering to add, "oh, and I'm in a high-risk group, oh yeah and also I believe in jury nullification."
>
> She responded slowly and methodically. "Do you feel like that would interfere with your ability to evaluate the evidence fairly?"
>
> I had heard her ask the same question of the other prospective jurors twenty times that morning already. Everyone else, no matter what the issue, responded that it would not.
>
> "No." I pronounced definitively, feeling guilty.

The conventional research process is linear - theorize, design, draft, secure funding, secure Institutional Review Board approval, collect data, and analysis. My research process looks like a pile of spaghetti on a plate. It is laughable to think about the high-minded ambitions I had for my dissertation in the early years of my scholarship. I thought that I could design a project that is about the community, for the community. Maybe in the end it will be – I fervently hope so. First and foremost, however, this dissertation has ended up being about me. It is a counting rope with a hundred knots, an old scratched up CD underneath a car seat, a tattoo blistered and blown out and poorly healed. It is an unchanged sheet kept on a bed in an undergraduate dorm room for four years, badly stained, ripped, unrecognizable from how it started, a shameful record of every mistake and adaptation I have made since I decided to become a graduate scholar.

Conclusion

An autoethnography is research, self-focused research, but research non-the-less, and research must at the end achieve two things – it must establish facts and reach new conclusions. So here it goes:

The world of academia is a positivistic, meritocratic, capitalist system that cannot decide what it wants its graduate scholars to be. We exist to supplement a population of adjunct instructors, as assistants to researchers, as students paying into an educational system. We also exist as autonomous intellectuals, self-driven researchers, authors and artists, to say nothing of our personal identities as partners and fathers and mothers and sisters and brothers. When the engaged communication scholar Larry Frey came to speak at Purdue during my tenure, he told me "American universities are prisons. And the very best prisoners are allowed to become guards." That too, is our role here in academia.

COVID-19 laid bare all of these hypocrisies in the system, a system that wants us to be champions for communities in need but struggles to recognize needs in us. For a long time the machinery of the university has worn away at humanity within scholarship, and the individual scholar has been the force ratcheting back on this process. When undergraduate students suffer and struggle, the teacher is the point of contact that can serve as advocate for them. Likewise, when communities are reduced to subject within the positivist gaze of Science, it is the researcher who can convert the gaze into a hand, outreached in friendship. COVID-19 made those individual acts harder, when it took away are ability to directly interact with others, when it eroded our networks of support, and when it forced us to abandon the skills and tools we had sharpened for new, strange, and untested technologies.

Scholarship does not take place in a vacuum. It is a product of context – not just the research context where the subjects are, but the researcher's context, the social context, the geo-

political context, the health context, the environmental context, etc. The guiding theoretical ideas supporting my work – resilience, engaged scholarship, cascading crises, collective action – these are theories that flowed both ways in my research project. The doing of my dissertation required a great reserve of personal resilience. I adapted myself to the new normal of chasing interviews, calling people at all hours, listening to audio and video recordings of meetings for days at a time, and writing each day until my brain ran out my ears and onto the desk in front of me. I leveraged my communication networks, constructed new logics and new ways of thinking, foregrounded writing every day while I backgrounded my fears, anxieties, and feelings of inadequacy aside (Buzzanell, 2010). The dissertation was also a form of collective action. My advisors were a constant source of support, driving me to do more, theorize more, develop more. My family stood by me through everything. I would have given up entirely if it weren't for Jamila reading my drafts, sending me meals, and listening to me rant incessantly about PFAS at all hours of the night. This document is a product of these networks of support that came together around me.

I also was reliant upon the relationships of support I formed with Parchment and Cooper Township. While I encountered challenges in recruitment, the community was remarkable in their willingness to communicate openly with me about their experiences. Participation in research is an important form of collective action, particularly in this context, and this research would be unachievable without their help. The stories the people of Parchment and Cooper Township shared with me were compelling and inspiring, and I often relied upon these stories to bolster my personal resilience and motivate me to finish the dissertation.

My resilience, my actions, my successes and failures with this project - these things also impacted the community of focus. I failed to achieve the high-minded ideals of engaged scholarship I set out for, but I am not the victim of that failure – I will (in all likelihood) still finish

my degree, still graduate, even still benefit from the professional esteem of calling myself an engaged scholar. The value that was lost when I changed my research design was the value to the people of Parchment and Cooper Township. The confluence of crises – PFAS and COVID-19 – reduced my capacity to directly serve the community of focus. The lost impacts are untraceable, intangible, but they are real. If I had been more resilient, had better coped with the disruption, had better leveraged my resources, the people of Parchment and Cooper Township would be, to some degree, better off.

The most important insight from this auto-ethnography is not theoretical, but personal. It cannot be understated how much of *me* is in this piece, how the theories and ideas and words flowed through my veins and were pumped by my heart before making their way onto the pages of this dissertation. The successes of this project are mine as well as the failures, this is something I did not fully recognize before writing this chapter. I do not know if I will auto-ethnographize again, but I do know that the same statement holds true of every research project that ever takes place. The story of the research is as much the story of the researcher as any subject, and without that story being told the research cannot be fully reported.

r-e-p-o-r-t-e-d.

 I finished typing and leaned back in my chair. My mind is reeling.

Is that good enough? Is that honest enough? Did I bear enough of my soul for an auto-ethnography? Did I tell enough stories? Did I tie it all together at the end, neatly, succinctly, did I package myself up tightly enough for my committee to understand?

I begin to sloppily jot a list – "Publishing Plans" I write across the top.

I can submit the autoethnography chapter to the International Communication Association's conference for 2022. My dad is pulling together a panel submission on the doing of research during COVID. If I take out the weirder bits, the chapter should be an easy acceptance there. *After that… journals, probably. JACR? No, probably not. JOCC?* I add some more ideas to the bottom of my list.

It probably won't be good enough.

I pick up my mug and drain the last lukewarm sips of coffee. *Maybe I should edit that Gramsci bit again.* I crack my knuckles and scroll back up.

CHAPTER 7 - IMPLICATIONS

This dissertation began by describing a set of goals and intentions for exploring the issues of PFAS contamination in and around the community of Parchment and Cooper Township, Michigan. This study involved an integrated analysis of the ways these communities used communication processes to inform and construct responses to a disruptive event involving PFAS contamination. Response to contamination events requires effective community engagement and communication (EPA 1, 2019, Senecah, 2004). This project was proposed to construct an understanding of the community's response to these issues through the interplay of communication, resilience, and collective action. Grounded in the paradigms of Crystallization and the Scholarship of Engagement, this project leveraged creative and non-traditional research forms, as well as relationally attentive and self-reflective approaches to evaluate and improve the community's response while developing strategies for future cases of contamination.

This chapter integrates insights and conclusions from the investigations presented in earlier chapters to address the four research questions which guided this project. The integrated results presented here draw on insights gained through two thematic analyses, each one guided by related but distinct theories of resilience and collective action. The review of literature presented in Chapter two, the narrative history described in Chapter three, and the auto-ethnographic self-reflection presented in Chapter six are also used to provide greater context for the insights discussed within this chapter.

Research Questions

The four research questions guiding this project focused specifically on the enactment of resilience and collective action.

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RQ1: How has the community of Parchment and Cooper Township enacted resilience towards the issues of PFAS contamination?

RQ2: How has the community of Parchment and Cooper Township organized towards collective action to address the issues made salient by the discovery of PFAS contamination?

RQ3: How might the community of Parchment and Cooper Township improve their capacities for resilience?

RQ4: How might the community of Parchment and Cooper Township improve their capacities for collective action?

These questions are broadly grounded in the literature discussed in Chapter two of this document and constructed around an understanding of resilience and collective action as interrelated, inter-dependent concepts that together function to describe a community's overall response to a serious disruption such as crisis. The discovery that a community's drinking water is contaminated with a chemical that causes serious health problems is a crisis. The impact is compounded by uncertainty about how long the water has been contaminated and what specific health effects may occur.

Research questions one and two were developed specifically to assess the efficacy of community response following the discovery of PFAS contamination. Questions three and four were developed to identify key areas where intervention might occur to improve the community's overall response, as well as to identify strategies and tactics which may inform communities' responses to similar issues in the future.

These research questions are addressed through two thematic analyses described in detail in Chapters four and five. In Chapter four, a thematic analysis of 26 public meetings organized in response to issues of PFAS contamination was presented. This analysis used the theoretical frameworks of the Communities Advancing Resilience Toolkit (CART) as well as the Trinity of Voice (TOV) theory as analytical tools to assess resilience and collective action as they manifested

within dialogic encounters during these meetings. Town meetings are common forms of community engagement used during environmental contamination events (McComas & Besley, 2010). The CART and TOV frameworks were selected because of their direct relevance to the town meeting as a public dialogic event and because they allowed for the processes of resilience and collective action to be identified and described both at a community and a state-wide scale. While only seven of the meetings examined took place in Parchment and Cooper Township, community meetings throughout the state of Michigan addressed PFAS contamination and frequently referenced the circumstances in Parchment. This allowed for a broader scale of analysis involving the larger issues of PFAS contamination and the identification of a larger set or themes.

In Chapter five, a thematic analysis of 12 unstructured key informant conversations with members of the target community was presented. This analysis utilized the Communication Theory of Resilience and The Social Capital Assessment Tool (SOCAT). These frameworks for analysis were selected because of the dual capacity to describe resilience and social capital at the level of the individual while also providing insight into the manifestation of the processes at the level of the community.

Integrated Results

Research Question One

Research question one asked, how has the community of Parchment, MI and Cooper Township enacted resilience toward the issues of PFAS contamination? This question was constructed to evaluate community resilience toward the issues associated with a serious disruption.

In Chapter four, resilience was operationalized primarily through the CART framework, specifically the four interrelated domains of resilience that this framework advances. Those

domains include: 1) connection and caring, 2) resources, 3) transformative potential, and 4) disaster management. These domains were assessed as themes which emerged within the meetings examined and were identified through context-based coding of video archives of the town meetings. All four key domains were observed within the meetings examined, albeit to different degrees and enacted in different ways.

Meetings were found to leverage and reinforce themes of connection and caring. Networked connections between local, state, and federal organizations were evident across meetings within the target community and were a prominent feature of the meetings. Community identity intersected with the use of community spaces and local faith-based and education-based networks. The participation of elected political leaders and representatives of local, state, and federal agencies, as well as established and emergent groups demonstrated a network of information and support. MPART, the state system for coordinating agencies and disseminating information, was referenced frequently in meetings as an innovative and active coordinating network.

Participants often evoked sentiments of community care, and leadership emphasized care as a guiding value informing the meetings. The enactment of support drew on established networks within the community, specifically churches and schools. These results were also consistent with themes observed in key informant conversations. Caring for community members and putting the good of community above other needs was a widely expressed and celebrated value with the community and was seen as reflective of the overall nature of Parchment and Cooper Township. The history of the community and the founding narrative of Jacob Kindleberger appeared to be important factors in the community identity and sense of caring.

Resource use was a broad focus of the community meetings. Resource sourcing and distribution was a primary focus of early meetings, and labor in particular was a resource which saw a great deal of emphasis within the target community. It was also a manifestation of community caring. The primary resource used to build resilience was information. Meetings were used primarily as a means of informing and updating the community. Information as a resource, then, was associated with networks.

Transformative potential was also present but at a lesser degree and was primarily discussed in terms of state-wide action and efforts to change regulations. Some expressions of powerlessness in the face of a persistent chemical, known as a bio-accumulate, also occurred as described in Chapter five. These expressions became more frequent as it became clear that no resolution of the contamination was forthcoming.

Disaster management themes were discussed in detail across meetings and focused on questions of coordination, risk mitigation, and broad-scale monitoring of contaminated sites. These involved resource issues such as distribution of bottled water and filters and the connection of Parchment to the Kalamazoo water system. Resources, as discussed earlier, were also informational. Disaster management was also connected to the larger network structure – external organizations including local health departments in other communities, state and federal agencies, and even potentially responsible parties (PRPs) were involved in management and mitigation.

Town meetings also demonstrated the importance of networks, both established and emergent, within the community, between communities and with various agencies. This suggests that within the context of town meetings, the elements of CART are closely connected and the elements of caring, resources and disaster management are enacted through networks. This is

consistent with the view of communication as an essential process for the other domains of CART (Pfefferbaum, et al, 2015).

This analysis demonstrated the prominence of town meetings as a place for community sensemaking, organizing, and for the development of networks. These meetings were the primary channels used in communication around the issue, and results of the analysis indicate that they were effective. Key informants referenced the importance of meetings as especially important places for information sharing and distribution and critiqued other channels (such as social media) as less effective. Meetings were contexts for community members to share their stories, questions and concerns and collectively make sense. Processes of collective sensemaking were observed both within and between the community members, with many participants across multiple meetings evoking very personal narratives of the crisis.

In Chapter five, resilience was operationalized in terms of the Communication Theory of Resilience. Buzannell (2019, 2020) argued that resilience is a collective and emergent communication enabled process that allows individuals to bounce back and reintegrate from serious disruptions. Communication is necessary for the co-construction of a new, post-disruption normal. Specifically, five interrelated processes are related to the enactment of resilience: (a) crafting normalcy, (b) affirming identity anchors, (c) maintaining and using communication networks, (d) constructing alternative logics, and (e) foregrounding productive action while backgrounding negative emotion.

Participants indicated that they had adapted to living with the issues of PFAS contamination and adapted their behaviors to accommodate these issues. Risk-reduction strategies such as running and flushing the water before drinking or using it, acquiring and using bottled water and water filters and avoiding eating fish from contaminated waters were activities described

by key informants. Other adaptations were psychological – many participants reported simply trying to not think about the contamination, to ignore fears, worries, and concerns about potential health impacts, and to work to put the issue behind them. The new psychological normal was facilitated by a general acceptance throughout the community that little could be done about past exposure to PFAS.

As with the town meetings, communication networks were important in facilitating response. Networks from existing community structures and organizations which include schools, political institutions and churches were used in developing and applying resources. Networks with local and state agencies also were important as ways of creating a sense of unified and coordinated response effort. A broad inter-community response was highlighted by many key informants, and the capacity of local health organizations to share information and resources was an important element of the initial response. Participants did critique the capacity of external organizations to continue to perform resilience functions over a long period. There was a feeling that these organizations would reduce their involvement over time. Local organizations and informal network ties seemed better positioned to support resilience in the long term.

Identity anchor themes were expressed in both individual and communal terms. Roles such as faith leader, parent, activist, public health official or elected official were reiterated and reinforced. These roles were described in relation to the issues of contamination and response, and generally positioned within a narrative accounting of the event. These roles were instrumental in enacting a larger community framework of resilience. The established cultural history and sense of community belonging was also important and an identity anchor.

Alternative logics were not as clearly evident in the responses of key informants, although many participants indicated frustrations with the uncertainty about potential health effects. The

logic of sharing a contamination experience with other communities was also used as a way to construct resilience through a feeling of we are not alone. Other water crisis events were commonly evoked in meetings to construct understanding of the issues of PFAS.

Foregrounding productive actions was not a prominent element in the enacted responses. Key informant interviewees struggled to identify and enact productive and meaningful actions that could be taken to mitigate the harmful effects of PFAS exposure. The exposure could not be reversed. PFAS could not be removed from the environment. Harmful effects were generally unclear and unknown and would not be evident for some time. The primary productive actions reported were participation in the community health study and working to change environmental laws. Backgrounding negative emotions was a primary challenge for key informants. While many claimed to have moved on from their concerns about the issues, they also reflected feelings of grief, frustration and sometimes anger which influenced attitudes and behaviors towards resilience.

An integrated examination of results across both analyses presents a picture of a community which was generally successful at enacting resilience, however struggled with certain aspects and processes including the high uncertainty and inaccessibility of technical information, foregrounding productive action, and maximizing transformative potential. These struggles may be associated with the nature of the issue resilience was being enacted against. Contamination of drinking water with PFAS created limited opportunities to foreground productive action and act upon the issue itself. A lack of a clear path of action coupled with high levels of uncertainty, a relatively unique factor of the disruptive event examined, created obstacles to these resilience processes that could not be easily surmounted.

Research Question Two

Research question two asked, how have the people of Parchment, MI and Cooper Township organized towards collective action to address the issues made salient by the discovery of PFAS contamination?

In Chapter four collective action was operationalized in terms of the TOV theory. This theory holds that effective participatory action, such as a town meeting, is a function of access, standing, and influence. As with the CART framework, these three voices were assessed as themes which were expressed during public meetings.

These voices were found to be used effectively throughout the meetings examined, and together seemed to function to enable effective participatory interaction within the examined contexts. However, contextualization within key information conversations casts some doubt on the representational nature of the insights gained in the meeting analysis. Structural choices were made which facilitated access across the community, including choices of time, place, and the decision to make available records of public meetings. Information about meetings was generally distributed by email, and recordings were posted online, presenting some issues of access related to information technology. Recruitment challenges encountered by the research suggest that some community members may not have high degrees of digital literacy, further exacerbating issues of access. It is almost certain not all members of the community participated in the town meetings or were even given opportunities for inclusion.

The meeting analysis showed multiple instances of collective decision-making and reflexive leadership, with community members appearing to directly influence the political agenda within the community. Key informant conversations mostly supported this insight, with a few individuals noting a hesitancy by leadership to listen broadly to community concerns.

Standing was again secured through community identity and political and expert authority. While in the meeting analysis external actors seemed to speak with a great deal of authority, subsequent key informant conversations revealed skepticism about the value-add of outside experts and political actors in meetings. Familial identity and community history was of prime importance in establishing standing, and this is consistent with attitudes towards community identity displayed in key informant conversations.

In Chapter five collective action was understood as a key emergent property of social capital, and social capital was operationalized in terms of the SOCAT framework. Social capital was approached in terms of structural, cognitive, and cultural capital. Structural capital refers broadly to bonding ties between family and friends, linking ties between organizations and institutions, and bridging ties which connect external to a community. Cognitive capital references trust, values, social norms, attitudes, and beliefs. Cultural capital, a dimension not incorporated in the SOCAT framework, references the particular literacies necessary to understand and appreciate culture.

Key informants identified structural social capital as critical in the initial response to the crisis, but as failing in long term enactment of collective action. External organizations including state and federal level agencies were effect in management and mitigation but were perceived as largely disengaging after the initial crisis was seen as resolved. It is meaningful to highlight that this perception does not directly track with reality – state level health organizations continued to remain invested in the community through the mechanism of long-term health studies, however many community members have been generally disinterested in participation with this kind of activity. Long term collective action in the form of political advocacy has primarily functioned through bridging ties between affected communities, and the capacities of motivated actors in

multiple communities impacted by PFAS to work together across geographic and community boundaries was widely celebrated by key informants.

Cognitive social capital followed essentially the same pattern as structural social capital. In the initial response, trust and shared values of community care and common good were fundamental in sourcing support and managing the initial crisis. These cognitive resources however did not transfer well towards long term response. Attitudes of community care were reoriented towards other more salient and visible issues, and community political beliefs interfered with coalition building around issues related to PFAS. Instead, those interested in long-term collective action looked elsewhere, constructing values-based ties with those in other affected communities willing to act.

Cultural capital was held to be an important aspect of community identity by most key informants, and alignment with local culture was seen as a key factor enabling community care and shared support. Cultural belonging was expressed in terms of place, legacy and a clear sense of community values. Having a history with the town and with the mill was of clear importance to respondents. Similarly, the crisis event itself was seen as an important aspect towards participation in collective action.

Key informants did not identify how the primacy of cultural identity functioned as a barrier or screen towards participation in collective action, however, this is likely a function of the sample secured for these conversations. Individuals interviewed tended to be those involved in collective action and thus were not pre-screened out of action through cultural barriers. Gray (2005) would suggest that elements of the community were likely excluded due to the high degree of cultural capital needed for involvement in collective action.

The primacy of cultural capital may also have functioned to create barriers for external actors and long-term action. A belief that having experienced the crisis was necessary to understand the crisis was one reason given to this researcher by potential key informants who were unwilling to be interviewed. Similar attitudes may contribute to unwillingness to participate in health studies and unwillingness to engage with external agencies.

An integrated examination of results across both analyses shows that collective action was effective both in the immediate aftermath of the crisis and in the long-term. However, long-term collective action did not appear to motivate internal community elements and collective action was instead reliant on inter-community ties. The long-term collective action in influencing political agendas received significant attention. This level of action would be more successful and reach goals of changing regulations more easily if it activates internal community components to action. The lack of motivation internal to the community was identified by key informants as a frustrating aspect of their work.

Research Question Three

Research question three asked, how might the community of Parchment, MI and Cooper Township improve their capacities for resilience? Unlike questions one and two, this research question was constructed to identify potential opportunities for intervention in community enactment of resilience. Insights from question one were used to highlight areas in Parchment and Cooper Township's response where the enactment of resilience was less prominent or incomplete. These insights can then be used to suggest areas for development. This is not to suggest any inherent deficit in the community or its response. It is designed to point out opportunities that can inform ongoing efforts by the community to respond to the contamination and to inform future

disruptions. Learning to inform future responses can be a positive outcome from a serious disruption (Larsson, 2010).

The examination of resilience presented in Chapter four employed the CART framework to explore the ways resilience was enacted in town meetings. CART suggests that four domains related to resilience: Caring and Connecting, Utilization of Resources, Transformative Potential, and Disaster Management. Caring and connecting was demonstrated in the town meeting, especially in the early meetings. Over time, the levels of connecting and caring appeared to decline. The primary resource evident in meetings was information. An additional resource evident in the town meetings involved political influence. Politicians from various levels and from both major political parties participated and pledged to work to change regulations. Transformative potential was a domain that was less evident in the town meetings. Over time, participants began to reflect a view that nothing could be done to change the reality of the contamination. As described earlier, this may be a function of the fact that PFAS is known as the forever chemical and the fact that health effects are unknown. The low level of transformative potential was one of the greatest limitations on developing resilience. Finally, disaster management as a process of immediate response to a threatening disruption was well represented. Quick action was taken to notify the community, distribute bottled water, flush the water system, and connect it to the Kalamazoo system. The disaster response was significantly enabled by the State of Michigan MPART program to identify and coordinate a PFAS response. Connecting and caring and transformative potential were the two domains least well represented in the town meetings.

Similar themes were evident in the analysis of the key informant interviews using the five elements of (a) crafting normalcy, (b) affirming identity anchors, (c) maintaining and using communication networks, (d) constructing alternative logics, and (e) foregrounding productive

action while backgrounding negative emotion. Normalcy was crafted by adjustments residents made to their behaviors such as running the water before drinking or using it, acquiring and using bottled water, and avoiding eating locally caught fish, and through cognitive strategies of moving on. Networks from existing community structures and organizations including schools, political and government institutions, and churches, were used to identify and distribute resources. Interestingly, alternative logics were enabled by a clear target for blame and the high degree of uncertainty associated with health effects. Backgrounding negative feelings while foregrounding positive action was hampered by the lack of actions that could be taken to counter or offset the harm. This was the aspect of resilience that was least evident in the key informant interviews.

The communities of Parchment and Cooper Township can improve their capacities for resilience in a variety of ways. First, there are opportunities to build transformative potential and networks by continuing and expanding efforts to change PFAS regulation. While changes in regulations, including EPA recommendations for allowable lifetime health advisory level of 70 parts per trillion health advisory level will not offset the exposure of residents, it would allow for a reframing of the experience. It may allow the community to create a narrative that something good is coming from their water contamination event.

Creating a broader coordinated effort with other Michigan PFAS communities, such as Rockford and Oscoda would help build and expand a network of support and influence. This can include building political influence. In addition, documenting the lessons of response could serve as a resource for other communities. Creating a community manual for PFAS response could help enhance transformative potential and would be a way to foreground productive action. This document would serve as a valuable resource for other communities seeking to build resilience in response to contamination.

A third and related method for increasing resilience is to document the experience in responding to PFAS. Local and oral history projects can help codify and communicate community values, resources, and norms. The Parchment Community Library maintains an extensive collection of local and oral histories yet does not include materials on the community's experiences with PFAS. An effort to document and catalog the experiences with PFAS can contribute an additional narrative to the story of Parchment.

The combined impact of COVID-19 and the PFAS contamination likely affected the mental health of the community. Participants in town meetings as well as key informants interviewed for this project indicated difficulty coping with, processing, and moving on from feelings of grief, confusion, and helplessness related to PFAS and potential emergent health impacts. Mental health resources should be available to community members to help develop strategies and techniques to constructively manage with these feelings in line with backgrounding while legitimizing negative emotions. The lack of opportunities for productive action towards psychic health could be redirected towards productive action addressing mental health issues.

The Agency for Toxic Substances and Disease Registry developed a mental health and stress resource toolkit related to PFAS issues, which was made available at some town meetings in some communities in Michigan. This toolkit was not, however, made available in Parchment or Cooper Township. The information contained within this toolkit is rudimentary, and in communities where the tool kit was made available, few community members opted to make use of the resources contained within, according to one key informant. Despite these limitations, the toolkit represents a possible solution to a key resource gap in the target community.

PFAS literacy has been a key focus of outreach by state and community leaders, but due to the nature of PFAS as an emergent science and the limited information on human health impacts,

the information made available to the community is limited and usually quite technical in scope. Presentation of information in technical ways can impede access by community members. Education programs in the community would help to address these issues by enhancing the capacity of residents to understand the science of PFAS. Similarly, helping agencies present the science of PFAS in understandable ways and in a manner consistent with the best practices of risk communication is important.

Issue fatigue was identified as an emergent factor over time which complicated community enactment of resilience. This was also a function of the nature of the contamination. Resolution of legal cases may help residents create both a sense of closure and find ways to build upon the lessons of response and resilience and craft a new, positive post PFAS normalcy.

Research Question Four

Research Question four asked, how might the community of Parchment, MI and Cooper Township improve their capacities for collective action? As with question three, this question was constructed to identify opportunities for intervention within the community.

As discussed above in research question two, Chapter four approached collective action in terms of TOV theory. A vision of town meetings as instances of enacted deliberative democracy provides key insights into the influence of individual actors upon the broader processes of communal enaction of resilience and collective action. TOV theory also provides an excellent insight into the processes of scaling up that occurred throughout the life cycle of this crisis and helps to identify the successes and failings of agencies and organizations seeking to listen to community voices. In this case, local leaders and agencies prioritized direct communication with community members throughout the crisis. While as some key informants noted, this communication may have to an extent been performative, the use of town meetings facilitated the

creation of key ties between actors and organizations, and successfully empowered community members to speak and influence leaders and other actors.

In Chapter five collective action was approached in terms of the SOCAT framework. Examining narratives of personal experience through the lens of social capital generation and utilization proved an effective metric for evaluating collective action. As noted above in the discussion of research question two, the primary failure of collective action was in the ability of community members to convert local community ties – both structural and cognitive – into action on a long-term scale. This would have been an easier task were it not for direct barriers to action which existed within the community. These barriers interfered with the ability of existing social capital to be utilized towards collective action, necessitating actors to establish ties outside the community. The internal failure of long-term collective action may in fact have been a driver of overall success. Had actors not forced to look for support externally, the overall collective action may have been less effective at influencing federal policy.

An integrated analysis of collective action reveals a number of key barriers which restricted action in this case. Removing these barriers through network intervention, structural changes, or community sense-making would improve capacities for collective action internal to the community. The primary barrier interfering with collective action was a lack of perceived efficacy of action. Community members reported that they did not feel that collective action had the potential to resolve issues, and in many cases, there was not community consensus as to what if any issues needed to be resolved. A lack of clarity regarding health impacts, PRPs, and additional technical information related to the issue was likely a contributing factor to this lack of perceived efficacy. Interventions should prioritize communicating technical information to the community in non-technical, easy to understand formats across a number of channels. Science communicators should

be utilized alongside technical experts to ensure messaging is understood by the community. The reliance on town meetings and digital communications to communicate information should be supplemented with physical materials, as the recruitment obstacles encountered in this research demonstrate some issues with digital illiteracy within the community.

Paradoxically, over-reliance on community history and familial identity in establishing standing may be creating further obstacles to collective action. As identified in the meeting analysis, standing was primarily established through a reference to community identity such as length and location of residency. This was also reflected in the key informant conversations through the theme of cultural capital. While the informants interviewed for this study did not indicate, generally, a lack of cultural capital, feeling left out or unable to establish standing. This may have contributed to general unwillingness of some to get involved in broader political advocacy. The strong sense of community identity tied up in the paper mill and the history of the area is effective in bonding together individuals with stakes in those identity markers but may be creating barriers to those who feel they cannot establish that same historical identity. This may also be a contributing factor to the perceived age gap within the community and the failure of internal collective action in the long term. Artificial barriers constructed around historical legacy may have been one factor which drove younger actors to seek ties outside the community.

The perceived age gap was a primary factor interfering with the enactment of collective action within the community. Interventions should work to create ties across generational divides within the community, by involving retirees with school networks, by bridging connections between school networks and faith-based institutions, identified as a primary organizing space for older community members, and by encouraging cross-generational discourse around issues.

Values appeals which are effective at motivation action from older community members could also assist in motivating action.

Discussion

Implications for Resilience

The investigation of town meetings, when examined together with the key informant conversations, highlights several areas for development and expansion of the theories of resilience and collective action. This integrated analysis suggest that the nature of the issue may have influenced the ways resilience and collective action were enacted. The case of PFAS contamination in Parchment and Cooper Township was of extended duration without a clear beginning nor end point. The uncertainty about the health effects will create a long-term risk to residents without clarity about risk severity or mitigation strategies. Many communities experiencing contamination events face long-term struggles to not only build but sustain resilience. In this case the PFAS contamination event created especially high levels of uncertainty because of the lack of scientific knowledge about their health impacts along with limited information about how long the drinking water had been contaminated. As was evident in both the interviews and town meetings, there are very limited options for responding to PFAS contamination once it has occurred. There are no established methods for removing PFAS from the environment, and medical sciences are only beginning to examine effective strategies to reduce and manage health impacts of long-term exposure. As a result of these factors, the perceived ability of residents to foreground positive actions was severely limited.

Both CART and the Communication Theory of Resilience emphasize the specific conditions and circumstances of disruptions and the individual and community resources that exist

for building resilience. These approaches, however, do not explicitly include the type of disruption in their formulations. As described above, some condition may foreground some aspects of resilience and background other aspects. One way to expand communication theories of resilience is to explore the ways resilience is enacted within different contexts of disruption. Enactment may be influenced by self-efficacy, duration of the event, and levels of uncertainty.

The perceived ability to take meaningful action in response to a disruption is a form of self-efficacy. Bandura (1994) defined self-efficacy as "people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives". (p. 71). Perceived self-efficacy influences feelings, motivations and behaviors. While some kinds of disruptions may include logical steps that can be taken to reduce and contain harms, other kinds of events may not. Some analyses of climate change, for example, have suggested the a perceive inability of individuals to take actions is a significant challenge in motivating people to take action (Bostrom, Hayes & Crosman, 2019). A disruption that is accompanied with information on identifiable harm-reducing activities is more likely to result in the enactment of resilience through self-efficacy and foregrounding positive action. Disruptive events that are over quickly and have a defined end points may allow for a clearer way to construct a new normal. Finally, the uncertainty associated with an event may make information resources, communication assets, and social networks even more important. Theories of communication and resilience might incorporate self-efficacy as a way to explain and facilitate the development of resilience, especially in the process of foregrounding positive actions.

Disruptive events that are over quickly and have defined end points may allow for a clearer path towards the construction of a new normal. Conventional theories of crisis and disruption propose defined stages or phases, including a pre-crisis, crisis, and post-crisis stage (Pan, & Meng,

2016, Coombs 2014). Events that follow this conventional pattern may allow individuals to move on from a crisis more quickly, creating or returning to normal or new normal. As this analysis demonstrates, this is more challenging in long-term, slow moving crises, or when crises are exacerbated through cascading events. As Hart and Boin (2001) note "If a crisis is fuzzy and indeterminate, then deciding when it is over is not a self-evident, unproblematic act" (p. 29). Part of the indeterminate part of a disruption may include determining who is to blame and who should be held accountable (Benoit, 2014). A crisis with a clearly defined end point and clearly identifiable responsible groups or individuals, may result is a more rapid and complete enactment of a new normal.

Uncertainty associated with an event may make information resources, communication assets and networks more important. According to Lachlan, Spence, and Nelson (2010), "uncertainty is an inherently uncomfortable state, and information seeking is a common cognitive strategy when uncertainty is directly related to a perceived threat" (p. 39). Some forms of disruption can create more uncertainty than other kinds of events. If a disruptive event is familiar in the sense that it has been experienced before or if it is a well understood kind of event, it may produce lower levels of uncertainty. Novel or events and emerging risks that have less well understood risks will create more uncertainty. In these cases, information and as resources and the use of communication networks will be more important to building resilience. A disruptive event that produces especially high levels of uncertainty will require more information and rely more on networks to distribute that information for the enactment of resilience.

As discussed in Chapter five, results from this research highlight a need for the development of a contingency theory of communication and resilience. The influence of conditions of crisis events, including general conditions such as self-efficacy, duration, and uncertainty, as

well as contextual conditions, can directly impact and shape the ways that resilience processes manifest in relation to particular issues. Resilience frames should also be expanded beyond the limitations of single-event, single-issue, and single-community examinations. Cascading crises can produce multiple system shocks which repeatedly disrupt the functions of resilience processes. Descriptive frames are severely impacted in their ability to assess resilience in the context of cascading crises. Prescriptive frames lack substantive guidance for recovery following repeated system shocks.

Implications for collective action

This analysis helps demonstrate the important role of collective action in a community response to serious disruptions, including through resilience processes. Collective action can be understood as an outcome of various forms of social and cultural capital, which allow for the development and application of resources to a disruption. Structural, cognitive, and cultural capital are also related to the development of trust and social norms (Diani, 1997). Social capital can create strong and stable ties involving mutual trust and a recognition of broader obligations. These factors are presented in Figure 4 as a working model of the development of collective action. Structural, cognitive, and cultural capital create resources including networks that then can be used to develop collective action. Collective action is most likely to be associated with existing organizations, such as faith-based groups, schools or businesses. Other organizations may emerge if existing established organizational efforts are inadequate. Collective action may also take the form or political advocacy.

Cognitive Capital $\longrightarrow$

Resource sharing networks

(Connecting)

Organizational response

Structural Capital $\longrightarrow$

Emergent organizing

Values (Caring, Community)

Cultural Capital $\longrightarrow$

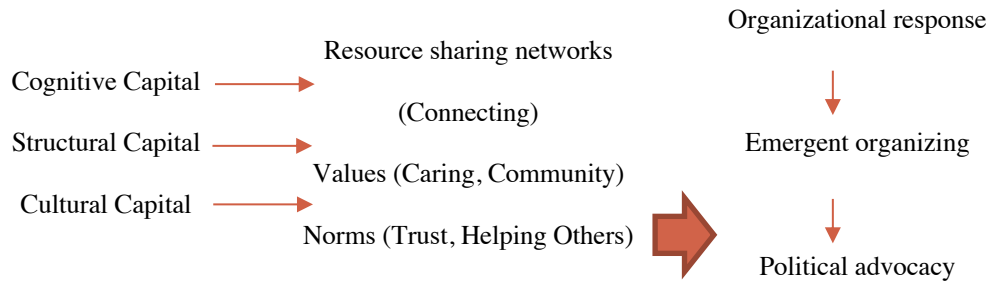Norms (Trust, Helping Others)

Political advocacy

Figure 4. Working Model of the Development of Collective Action

Results of this analysis indicate a strong interdependence of resilience and collective action. The factors identified in Figure 4 can be directly related to the kinds of network connections described in the Communication Theory of Resilience and CART as important factors in enacting resilience. In the case of Parchment and Cooper Township, social and cultural capital were associated with community organizations, including churches and schools, as well as a shared narrative about the founding of the community. Forms of capital were also developed and applied within the context of town meetings. Town meeting as a place for the community to come together, communicate, deliberate, and perform resilience are important resources for responses to serious disruptions (McComas et al. 2009). Theories of resilience might also seek to understand the role different forms and contexts of communication such as town meetings, community news outlets, and social media play in enacting resilience. While the CART framework does include community's communication resources in the framework, the ways specific resources impact resilience are not included (Pfefferbaum, et al, 2015).

As discussed in Chapter five, results indicate that the role of the individual actor in an organized collective action response may be underappreciated in theories of collective action (Klandermans & Oegema, 1987; Diani, 1992; Pretty 2003). In the case of Parchment, apparent inadequacies in the social capital and response network were compensated by the direct actions of

motivated actors within the community. The capacity of individuals especially committed to transformative work within a community can serve to address many resource gaps which otherwise function as barriers to collective action.

The capacities of these individuals identified in this research also propose new directions for intervention in collective action. Traditionally, intervention approaches act upon the nodes internal to a network to overcome gaps and limitations in the response network (Valente, 2012). However the elevation of exceptional actors within the network and the creation of inter-community ties can directly facilitate the movement of key information and resources and quickly transcend barriers to effective action.

Implications for engaged scholarship

The complications experienced in the execution of this research highlight the need for additional theorizing concerning engaged scholarship in crisis contexts. Conventional guidance for engaged work prioritizes longitudinal research projects that allow direct face-to-face engagement with community participants throughout the research project. As is highlighted in Chapter six, this perspective is optimal but inflexible with regards to particular research constraints. This may result in research which has the appearance of engaged work without achieving actual impacts on the community of focus. As with resilience, there may be a need for the development of contingency approaches to engaged scholarship that anticipate emerging conditions which may impact research plans and goals. This includes changes in community research partners, changes in support, emerging conditions that may complicate design, emerging conditions that may confound results, changes in available resources (time, funding, attention), and changes in the personnel participating in the research. Particularly, the feedback effect of cascading crises on research projects should be examined, and strategies for research adaptation developed. Systematic

efforts to describe the impact of these and other intervening factors would expand theoretical and practical understandings of the doing of engaged research.

Direct outreach

A key principle of engaged scholarship is the capacity of research to include participant voices, communicate results directly to participant communities, and work to answer participant needs. Through this research, a number of potential avenues for direct outreach to the target community were identified.

Face-to-face town meetings should resume after risks related to COVID-19 have reduced and community gatherings are deemed safe. These meetings should prioritize education, mental health, and ongoing information sharing. Following the recent policy and legal decisions that impact the community, it will be increasingly important to ensure that all community members are aware of the resources that are available to them. These meetings can also help the community develop a unified sense of what the PFAS contamination events means and how to go forward in a productive way.

Additional informational resources should be made available to the community in physical and virtual formats and at regular intervals. As the difficulties encountered in recruitment suggested, a significant digital divide may exist within the community along demographic lines of age, education, and social class. Primary communication of information related to PFAS has thus far has been through email and social media. Traditional mail should be used along with digital channels.

A regular newsletter, sharing information in clear, concise, understandable ways, as well as perhaps sharing personal stories and updates from community members would serve to foster

community connection and shared values, encourage connection, and reduce information disfluency related to PFAS.

Strategies for future response

The overall effectiveness of the response of Parchment and Cooper Township to issues of PFAS suggest a number of key strategies and tactics which could be modeled in other cases of contamination. Drawing lessons from this case is a particularly important output of this project, as PFAS contamination is a new and emergent event type with many unique aspects.

One of the most important strategies employed in the response to PFAS issues in the state was the town meeting. The utility of these meetings in answering the needs made salient by the issues cannot be understated. Meetings proved to be a very efficient way to organize support and distribute resource to affected communities, leverage key formal and informal ties for response, and source information to and from the community. Although some key informants questioned the long-term value of these meetings, the capacity of the town meeting to facilitate communication across scale between community members, local leaders, and state and federal agencies is clear.

The widespread use of the meeting, as was stated by key informants in conversations as well as by actors in the meetings themselves, is a response to lessons learned by the state of Michigan from their experiences with the Flint Water Crisis. The capacity of the state to learn from their failings in Flint and prioritize direct communication with impacted communities is laudable and provided a basis of support in this case. This lesson-learning capacity by the state is a key factor facilitating resilience in light of future contamination issues.

An additional key insight from this case is the role of PRPs in the overall response. Georgia Pacific and 3M were quick to become involved in the overall response, and the community was effective in negotiating their relationship with these parties. Other communities, such as Oscoda,

had a very different and contentious relationship with the PRP, the US Air Force. Local leadership in Parchment prioritized maintaining ties to Georgia Pacific and 3M, which facilitated the movement of resources and information to help mitigate these issues. At the same time, community members were not reticent in pursuing legal action against these parties and holding these parties publicly accountable. The careful balancing of these relationships across different levels of the community allowed for an impressive number of key resources to be transferred from the PRPs towards the needs of the community. This balancing act was possible due to the decentralized yet coordinated actions of the community.

The creation and utilization of inter-community ties across broad geographic boundaries, as noted, is also a key strategy in the long-term response of this community. Local organizations, local and trans-local health organizations, state, and federal-level agencies worked effectively together to facilitate the response. More impressively, community actors created ties across communities based on shared experiences with issues, facilitating deliberate and effective collective action which directly impacted federal policy. The use of shared experience in the creation of these ties was remarkably effective at creating the basis for longer lasting and powerful collective action.

A key output goal of this and future research would be a Community Handbook on PFAS Contamination. The meetings and conversations examined in this analysis indicate confusion and inconsistency in the early stages of response, and difficulty maintaining momentum in the long-term. The unique aspects of PFAS make conventional response processes less appropriate. There is a clear need for community-based guidance providing techniques for community driven responses to these issues. This handbook should include clear and non-technical information about potential health impacts. The handbook should also establish procedures for immediate outreach

and response including identifying and sourcing support, identifying and answering community needs, mitigating mental and physical health impacts. Finally, the handbook should prescribe tactics for long term advocacy, including identifying targets for political and legal action, identifying allies, and mobilizing collective action.

Future research

This research begins the process of addressing the social science research gap in PFAS literature and serves to establish connections between impacted communities and research communities. However, many opportunities and needs for further research remain. Using this project as a foundation, a program of research should be established to continue to trace and develop understandings of the processes of resilience and collective action in the context of PFAS contamination as well as other issues. Suggested next steps in this program are described below.

The key informant conversations described in Chapter five were an important element facilitating the insights described above. However, many potential informants were unwilling to participate in remote conversations with the researcher. In addition, many of the conversations that did take place were limited in the richness of data that could be gathered due to the remote nature of the conversations. The remote format was mandated by the COVID-19 crisis. Future research should employ more direct ethnographic methods to gain information in collaboration with key informants. In-person conversations, face-to-face participation in community events, and direct immersion in the community would greatly enhance the capacity of researchers to understand the processes of resilience and collective action as they take place here.

The key informants examined here were in many ways demographically homogenous, and this study failed to adequately explore factors of race, gender, class, and religion in the constitution of resilience and collective action. Future research employing ethnographic methods should

endeavor to overcome these barriers through explorations of minority groups within the community, including different communities of faith, outreach to Black, Latinx, MENA, and Asian populations, and outreach to community members of various socio-economic standings within the community. Further investigations should explore the roles that these identity categories have in collective action and how these may have functioned as mechanism of inclusion and exclusion throughout the response. Access to resources, including resources being sourced to the community through recent political and legal victories, should be assessed in relation to identity categories to evaluate environmental and racial justice.

Parchment and Cooper Township are primarily middle class, white municipalities and benefit from the support of a relatively wealthy neighbor in Kalamazoo, MI. Other communities suffering drinking water contamination, such as Flint, MI, do not benefit from these same systemic privileges and have fared significantly worse in terms of response, recovery, and overall environmental justice (Pauli, 2019). Future research should compare and contrast the response and outcome of resilience processes for largely white, affluent communities to poorer, minority communities.

Subsequent research should also expand key-informant conversations outside of the confines of the community of Parchment and Cooper Township. Results revealed the importance of inter-community ties in facilitating resilience and collective action both in the immediate response to a water-related crisis and in long-term organizing around issues. This phenomenon should be explored further and from other perspectives. Key actors in other communities coping with issues of PFAS such as Oscoda, MI, Rockford, MI, Grayling, MI, and others are important nodes in the response network that has emerged around this issue. The resilience and collective

action that has taken place in and around Parchment, MI and Cooper Township is to a degree a function of the organizing that took place within and between these communities.

Original formulations of this research project before COVID-19 proposed a subsequent research phase utilizing social network analysis methods to trace the overall structure of response within the community. Insights from this study further highlight the benefits of using a social network approach to examine resilience and collective action on the community level. Network analysis is an area of research focused broadly on patterns of ties that exist between parts within a system (Easley & Kleinberg, 2010).

Social network analysis examines patterns of relationships – i.e., the connections that exist between individual nodes within a social system. A core theoretical assumption supporting social network analysis is the instinct that these relationships are critical to the constitution of a system, and that through an examination of these relationships some knowledge about the system can be gained (Monge & Contractor, 2003). In social network analysis, relationships between individuals (such as friendship, kinship, or even dislike) reveal broader patterns of interaction across the system, that can be used to characterize the core social structures that exist.

The primacy of inter-organizational, community, and inter-community ties which emerged through this analysis supports a network approach to resilience and collective action. Network methods are proven effective at assessing resilience within social systems as well as other examinations of network effects, such as community-based knowledge creation (social learning) and collective action (Folke, 2006). Social network methods also allow for greater visualization of multi-scalar aspects of water crises and collective activity, revealing the emergence of nodes and linkages across traditional vertical hierarchies and outside of conventional spatial and geographic boundaries (Eisenheart, 2016).

Expansion to other communities should also include an ethnographic analysis of state actors. As noted above, the capacity of state organizations to learn from the Flint Water Crisis and adapt those lessons to PFAS issues was highly effective. Future management of issues should 1) maintain these lesson learning capacities and 2) adapt these capacities for other organizations. In order for both of these functions to be met, this lesson learning capacity must be more fully understood.

Following expansion to other communities in Michigan, national and international examinations should be conducted. PFAS is a global contamination issue and different communities can be expected to respond in different ways. Shared cultural values are an important factor driving collective action and may have contributed to the emergence of inter-community advocacy in the state of Michigan. As PFAS issues become driving points of conversation and collaboration around the country and the world, so to must research expand to examine how organizing for resilience and collective action is taking place within these communities. This also follows the multi-scalar focus of this research – local organizing contributes to state and national level advocacy.

There may be some warrant to expanding beyond PFAS as a singular issue of focus and examine processes of response in the context of other slow moving water contamination events, especially over extended time frames. Key informant conversations suggested that contamination events such as the Flint Water Crisis served as focusing events facilitating fast response towards PFAS issues and aiding in the enaction of sense-making processes within the community examined. Understandings of the inter-connectedness between issues and how crises interact to make certain issues salient may help facilitate improved collective action towards PFAS and other water contamination events.

As discussed earlier, there are also opportunities to understand how the enactment of resilience varies based on the nature of the event. This might include the elements of self-efficacy, the level of uncertainty, and the duration of the disruptive event. Investigation of other events, such as various forms of natural disasters could provide an additional level of insight into processes of enacting resilience within specific contexts. There already exists a broad literature base applying the Communication Theory of Resilience to a variety of different crisis types. A meta-analysis of existing crisis and resilience literature could begin to evaluate the influence of crisis type on the enactment of resilience and lay the foundation for the development of a contingency approach. A similar systematic meta-analysis has already demonstrated the efficacy of this approach in evaluating and categorizing crisis literature (Seeger, in press).

Finally, as described in Chapter six, this research effort was significantly impacted by the COVID-19 pandemic. This required significant adjustments by the researcher as he sought to accommodate both the personal and professional impact of the event. The experience did demonstrate the importance of ways disruptive events may converge. Most work on resilience has examined isolated events but understanding multiple events will be increasingly important.

Conclusion

Parchment and Cooper Township are the site of a very severe contamination. The impacts of that contamination will continue to be felt in the community for generations to come. They are not however entirely unique communities. Like many, they must find ways to make sense of and respond to the legacy of industrial contamination. The concepts of resilience and collective action as described throughout this project are important frameworks for enacting constructive responses to serious disruptions. The ability to respond effectively will be increasingly important as more disruptive events occur and converge.

APPENDIX A - KEY INFORMANT INTERVIEW QUESTIONS

Processes of Resilience

1. (Normalcy) We are interested in your day-to-day life.

    a.   What community do you live in?

    b.   What do you do during the day?

    c.   How has your day-to-day life changed over the last few years?

    d.   Have the issues of PFAS contamination changed your day-to-day activities?

2. (Identity) We'd like to know more about who you are.

    a.   How do you see yourself?

    b.   How might other people in your community see you?

3. (Connectedness) We are interested in the people in your life.

    a.   Who do you spend the most time with?

    b.   Who do you talk to about your problems?

    c.   Who do you talk to about PFAS?

    d.   Are you a member of any community groups?

    e.   Have you attended any meetings about PFAS?

4. (Alternative logics; foregrounding productive action) Tells us about PFAS.

    a.   When did you first hear about issues of PFAS contamination? How?

    b.   How did you think about the water in Parchment before you heard about these issues?

    c.   How do you think about it now?

    d.   Tells use about how you feel about what is going on in Parchment right now.

    e.   Who do you think is responsible for the PFAS contamination?

f.   Do you feel that the agencies and organizations have responded to these issues effectively? (State agencies, local government?) Why or why not?

g.   Have you done anything to take action towards the issues of PFAS? Why or why not?

Community resilience and collective action

1. We are interested in communities.

    a.   What comes to mind when you think of a community?

    b.   What about your community? {Settle on a general understanding of community for the session.}

2. We are interested in your thoughts about connectedness in your community.

    a.   Tell me about how connected community members are with the community. Please share a few examples of connectedness.

    b.   Are there members or groups within the community who may feel left out?

    c.   What could be done to help them to feel more connected?

3. Do members of your community have hope about the future?

    a.   If so, what is the source of this hope?

    b.   If not, why are community members not hopeful about the future?

    c.   What evidence is there of hopefulness or lack thereof?

4. Does your community help people in need?

    a.   Are community members' concerns being heard by community leaders? Why or why not?

    b.   If not, what could be done to get the attention of community leaders?

    c.   Are the concerns of community members being addressed by community leaders? Why or why not?

    d.   If not, how might community leaders be encouraged to address these concerns?

5. I would like to ask some questions about resources. These could be natural resources, physical infrastructure, tools and machinery, the workforce, leadership, and productive social connections.

   a. What resources are available within your community for disaster readiness, response, and recovery?

   b. Are they adequate?

   c. What resources would improve the ability of your community to address disaster readiness, response, and recovery?

   d. How could your community acquire or develop these resources?

   e. Would your community support any of these measures to acquire/develop these resources?

6. What could be done to get your community to support these measures?

7. Communication is a major issue in addressing issues like PFAS.

   a. Do members of your community communicate effectively with each other?

   b. How do members of your community communicate with respect to the issues of PFAS contamination?

   c. Is this communication effective?

   d. How could this communication be improved?

8. What does your community do to prepare for other health crises?

   a. Are these activities adequate?

   b. How might this preparedness be improved?

   c. What would be required to make the recommended improvements?

9. What information is available in your community that would be useful in developing the community's ability to adapt to, and learn from, the issues of PFAS contamination?

   a. How is this information obtained? How might this information be used? Is it adequate?

   b. What additional information would be helpful?

   c. What would it take to acquire the information?

10. What opportunities exist to help people to develop skills that would improve your management of this issue?

   a. Do community members take advantage of these opportunities? Why or why not?

   b. How could you involve individuals or groups who are not taking advantage of opportunities to develop skills that would improve your community's disaster management?

   c. Are individuals or groups deliberately excluded from these opportunities? If so, who? Why?

   d. How could you include these individuals or groups? What would have to happen to involve these individuals or groups?

   e. What could be done to create opportunities in your community that help people to develop skills that would improve your community's management of this issue?

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