

COMMUNITY RESILIENCE IN THE CASE OF THE CABOT-KOPPERS SUPERFUND
SITE IN GAINESVILLE, FL

By

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To the Stephen Foster neighborhood residents, past, present and future

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Abstract of Thesis Presented to the Graduate School
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By

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The effects of disasters on communities may vary depending on community context and whether the disaster is technological or natural. This study explores how resilience develops in a community affected by a prolonged technological disaster. It examines whether resilience is an outcome or a process over time. The case examined is the Stephen Foster community in Gainesville, FL, the community most affected by the pollution at the Cabot-Koppers Superfund site. I used archival and interview data to identify events, processes, and commonly expressed ideas and feelings for the period 1983-2012. I developed a timeline of events and found three phases in the years after site establishment. I created a general model of the relationships between processes believed to affect resilience, based on the research literature. The model treats processes and the relationships to them as internal and external to the community. The nature of processes present varied over time, as did the effect of those processes on community resilience. Few processes were present in Phase 1 and all were external. Most processes in Phase 2 decreased resilience and there were few connections between internal and external processes. All hypothesized processes appeared, but

most decreased resilience. I draw three main conclusions. First, resilience is a process that results in different outcomes over time. Second, not all of the processes hypothesized to increase resilience do so. Some decrease resilience. Third, processes internal and external to the community have equally important effects on resilience.

CHAPTER 1 INTRODUCTION

The enactment of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) occurred December 11, 1980. Superfund is the common term for this legislation (U.S. Environmental Protection Agency, 2011a). “This law created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment (U.S. Environmental Protection Agency, 2011a, para. 1).” The National Priorities List (NPL) catalogues the sites across the U.S. requiring long-term response actions. The NPL refers to sites with serious environmental and public health impacts, although not life threatening (U.S. Environmental Protection Agency, 2011a). The Hazard Ranking System, or HRS scores each site on the NPL. Investigation of the site risks establishes the HRS score. These risks include ground water, surface water and aerial migration, and soil exposure contamination (U.S. Environmental Protection Agency, 2012d). The initial listing of the Cabot-Koppers (CK) Superfund site in Gainesville, FL, was September of 1983 (U.S. Environmental Protection Agency, 2012d). The final CK site listing was one year later.

Community Resilience and Disasters in Research

Research about disaster examines all aspects. These aspects include risk, hazards, planning, mitigation, recovery and response. Disaster research commonly distinguishes between natural and technological, or man-made, disasters for purposes of conceptualization and determination of appropriate measures of the components involved. Fundamentally different characteristics for these two categories exist with

regard to the disaster itself, the response, and the ways in which those affected cope and ultimately recover.

Some literature conceptualizes resilience as a process (Norris et al., 2008), although measurement is only feasible at specific points in time, even in longitudinal studies. As Mykota and Muhajarine (2005) note, “In reviewing the literature on community resilience, it is found that the concept is somewhat loosely defined and tends to be characterized by the objectives of the research undertaken” (p. 6).

Therefore, I treat community resilience as a series of outcomes embedded in a process over time. The same community may experience different resilient outcomes at different points in time during the process.

The specific context of a disaster, including both the duration and the type of disaster, also affects community-level resilience. The duration describes the length of time the disaster lasts, from onset to end. The type of disaster describes whether the disaster is natural, technological or has characteristics of both types. For example, a natural disaster, such as an earthquake, potentially has dissimilar impacts on a community rather than a technological disaster, such as an oil spill. Additionally, two disasters of the same type could have completely different durations, resulting in different community impacts. The affected community may respond differently to a short duration disaster versus one that unfolds slowly over an extended period. A community affected by a long duration disaster may begin responding and experiencing impacts during the disaster. Disasters that unfold slowly in duration are also potentially chronic over time. Chronic disasters are commonly technological, or at least have technological

characteristics. An example of a chronic disaster is the continued exposure of community residents to contamination, such as toxic chemicals or radiation.

The disaster's duration complicates the impacts on and response of the corresponding affected community. Therefore, the duration may be more important than the type of disaster. Disaggregating a disaster's contextual factors is impossible because type and duration intertwine. Moreover, the context of the community may be more important than that of the disaster. Community resilience depends on the conditions of a community before the disaster and afterwards (Norris et al., 2008). Specific characteristics of each community, such as context and history, predict a resilient or dysfunctional outcome. For example, a poor community exhibits resilience in a fundamentally different way than a rich community. According to Norris et al. (2008), "Poor communities not only are at greater risk for death and severe damage, but they often are less successful in mobilizing support after disasters" (p. 137).

Community impacts resulting from disasters last ten, 20 or more years, depending on the context of the disaster and the community. As a result, mitigation continues for an extended period of time to foster community resilience. Mitigation traditionally concludes at reconstruction of infrastructure, although communities suffer economic, social and psychological impacts. However, a recent shift in focus results from the knowledge that mitigation must go beyond the physical damage to the community and address the impacts on social processes. For example, a disaster can negatively affect residents' sense of community, a social process contributing to community resilience according to the literature. Rebuilding this sense of community is critical to effective mitigation that fosters resilience. Current understanding of how to

isolate, rebuild and ideally transform such social processes in the community is inadequate and requires expansion. This expansion would contribute to more robust community resilience interventions in their design and implementation. Therefore, a one-size-fits-all approach to understanding community resilience is impossible. This point is a crucial consideration when implementing community resilience interventions after a disaster.

Stephen Foster Community in Gainesville, FL

The hazardous waste from the CK Superfund site most directly affects the Stephen Foster (SF) neighborhood due to its spatial proximity to the site (Indoor Dust Dioxin Workgroup, 2011). Neighborhood and community are interchangeable terms in the present study. Economic and environmental impacts affect the community socially. Residents' concerns in this particular Gainesville community center on the health risks associated with exposure to hazardous substances originating from the site (Indoor Dust Dioxin Workgroup, 2011). In addition, the drawn-out cleanup process and impacts on property values are concerns of SF residents with regard to the CK site.

The SF neighborhood is part of the northwest quadrant of Gainesville, FL. The western boundary of the SF community is 13th St. The eastern boundary is between 4th St. and 2nd St. 39th Ave. is the northern boundary and 23rd Ave. is the southern boundary. The red lines indicate the SF community boundaries in Figure 1-1. Figure 1-2 presents the Census tract 3 boundaries. The boundaries of Census tract 3.02 closely mirror that of the SF community boundaries. Therefore, current Census data for Census tract 3.02 presented in Table 1-1 represents the SF neighborhood. The residents of the SF community are diverse racially and socioeconomically, as shown in the 2010 U.S. Census data (see Table 1-1). The SF community is more diverse racially than

Gainesville as a whole, although the difference is slight. The median housing value of Gainesville surpasses that of the SF community, although the median household income is higher in the SF community contrasting from Gainesville. Lower housing values may be due in part to the spatial proximity of the SF community to the CK site. The higher household income and higher employment percentage characterizes the SF community as working or middle class contrasting to that of Gainesville. Gainesville is a college town, and this contextual factor explains the close rates of owner and renter occupied housing units when comparing Gainesville to the SF community. This contextual factor also explains the elevated rates of high school graduate or higher in Gainesville and the SF community, although the bachelor's degree or higher percentages are significantly higher in Gainesville than in the SF community.

Table 1-2 shows the data over time for migration into Census tract 3 that encompasses Census tract 3.01 and 3.02. Owner occupied migration spikes in the 1990s and drops between 2000 and 2004 while the renter occupation rates rise steadily from the 1990s on. This change in owner occupied rate by tenure may be due in part to the spatial proximity of the Superfund site, particularly the emergence of information regarding contamination of the Floridan aquifer under the site in 2003.

Cabot-Koppers Superfund Site in Gainesville, FL

Cabot refers to a charcoal production facility and Koppers to an adjacent wood treatment facility. For the purposes of the NPL listing, the name refers to both industrial facilities as one Superfund site. The western boundary of the CK Superfund site begins at the eastern boundary of the SF neighborhood. The site extends to Main St. to mark the eastern boundary. 33rd Ave. is the northern boundary and the southern boundary of the site ends at 23rd Ave. The boundary of the former Cabot portion of the site, now

Northside Shopping Center, extends north only to 28th Ave. The eastern boundary of the Koppers portion of the site ends at railroad tracks that separate the Koppers from the former Cabot portion of the site. The blue lines indicate the CK site boundaries in Figure 1-1.

The site is nearly 100 years old (Indoor Dust Dioxin Workgroup, 2011). The final NPL listing date for the CK Superfund site is September 21, 1984 (U.S. Environmental Protection Agency, 2012a). The CK site is not a disaster in the traditional sense of a hurricane or an oil spill because superfund sites are slow-motion technological disasters (Cline et al. 2010). This site is representative of a disaster that unfolds slowly over time. Thirty years have passed since the initial site listing and the cleanup process is ongoing. During this time, social processes developing in the community may or may not be resilient at different points in time.

Table 1-1. Selected demographic characteristics of the population in the Stephen Foster community and Gainesville, FL, 2010.

Characteristic	Stephen Foster community	Gainesville, FL
Population	2,770	124,597
White	55.5%	58.3%
Black or African American	31.2%	21.9%
Hispanic or Latino	7.5%	10.1%
Owner occupied housing units	40.5%	38.5%
Renter occupied housing units	59.5%	61.5%
Median value of owner occupied units	\$122,400	\$164,500
Median household income	\$42,019	\$30,952
Population below poverty level	20.7%	35%
Female headed households	25.6%	33.7%
High school graduate or higher	96.6%	89.7%
Bachelor's degree or higher	26.1%	43.4%
Employed	67.1%	51.5%
Unemployed	8.4%	4.8%
Not in labor force	24.5%	43.7%

(U.S. Census, 2006-2011).

Table 1-2. Owner and renter occupied housing units of the population in the Stephen Foster community, Gainesville, FL, 1969-2005.

Stephen Foster community	Estimate in owner occupied housing units	Estimate in renter occupied housing units
Population	4,978	4,185
Moved in 2005 or later	793	2,787
Moved between 2000 and 2004	221	1,210
Moved between 1990 and 1999	244	118
Moved between 1980 and 1989	57	0
Moved between 1970 and 1979	43	63
Moved in 1969 or earlier	64	7

(U.S. Census, 2005-2009).

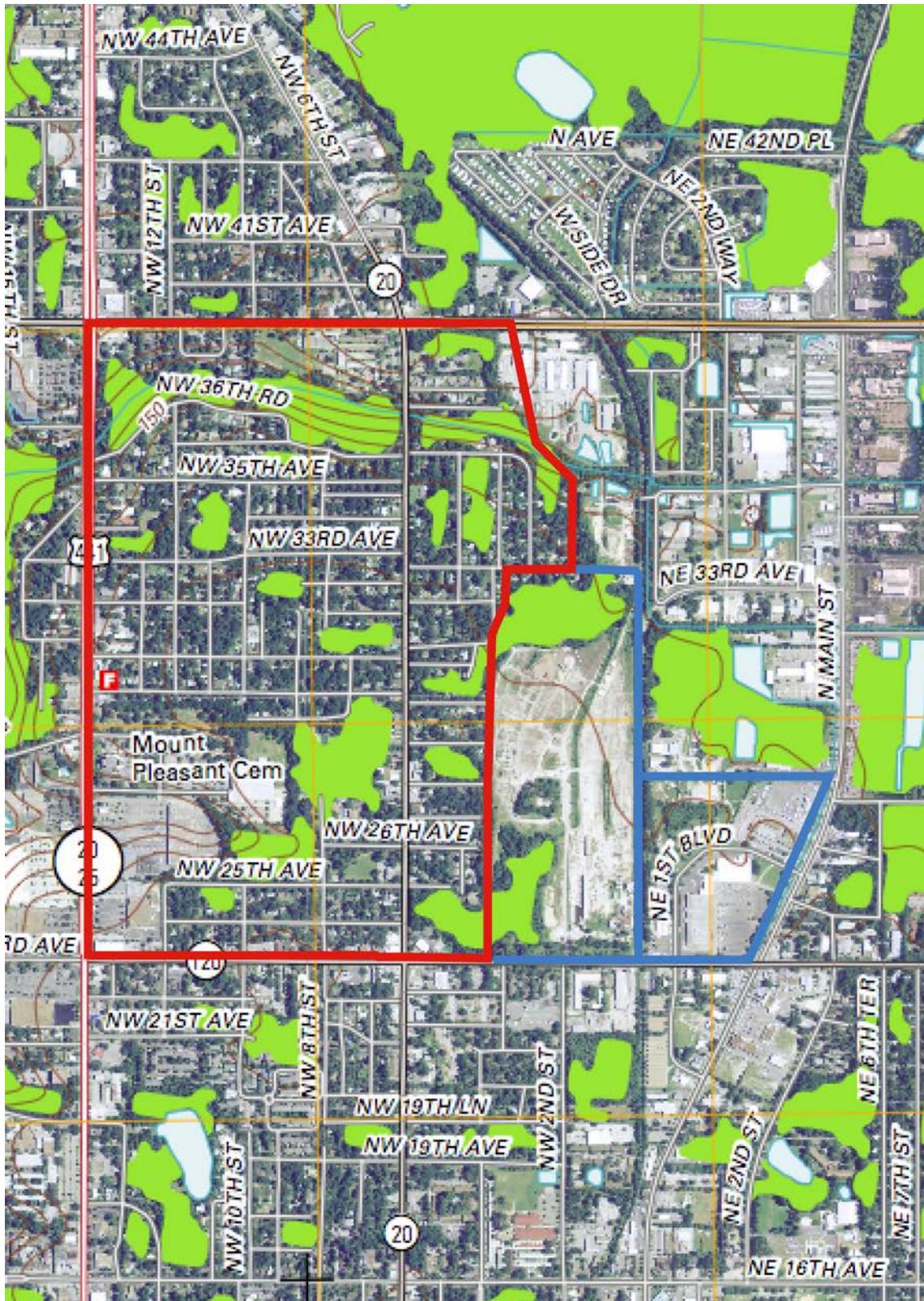


Figure 1-1. Location of the Stephen Foster community and the Cabot-Koppers Superfund site in Gainesville, FL (U.S. Geological Survey, 2012)

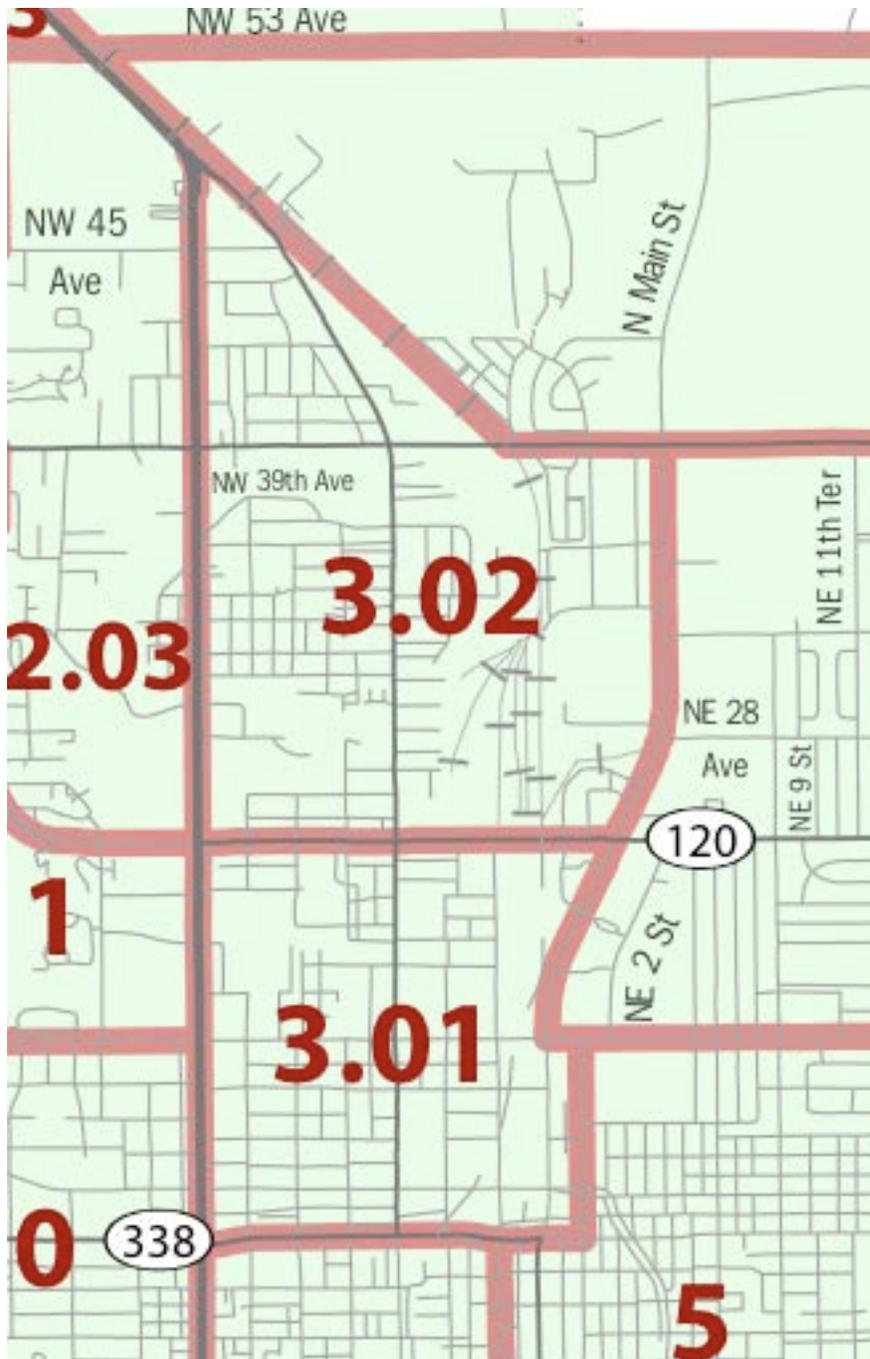


Figure 1-2. Census tract location and boundaries of the Stephen Foster community in Gainesville, FL (U.S. Census Bureau, 2011)

CHAPTER 2 LITERATURE REVIEW

Natural versus Technological Disasters

Technological disasters have an element of uncertainty with regard to their duration and consequences that can result in chronic mental health impacts for affected communities (Bolin, 1993; Furedi, 2007). Despite community disagreement, technological disasters can increase social support (Cline et al., 2010). Some literature indicates omission of human responsibility for the technology that causes technological disasters is a characteristic of such disasters (Kaniasty & Norris, 2004). According to McGinn and Spindel (2007), the effects of technological disasters last longer than the effects of natural disasters because people, on occasion, associate technological disasters with human carelessness. Community members can blame specific people or groups of people for carelessness that causes a technological disaster, while this characteristic of placing blame generally is not applicable to natural disasters. However, placing blame on specific people or groups of people for inadequate response following the disaster is characteristic of both natural and technological disasters.

Some researchers blur the distinction between these types of disasters due to human interference with the environment, resulting in the uncontrollable influence of man-made factors during natural disasters (Perry & Quarantelli, 2005). Mercuri and Angelique (2004) use the term na-tech, referring to a disaster where there are both natural and technological attributes. Williams (2008) comments on the convoluted classification of disasters in contemporary society, "What were traditionally thought natural disasters can be caused or exacerbated by human factors but

furthermore...events such as the Indian Ocean tsunami and Hurricane Katrina are so complex that they render the categories futile” (p. 1120).

Researchers disaggregate disasters, including technological, natural and na-tech, further by their duration. This distinction is more concise than the technological and natural distinction since two different disasters can be both technological, but have very different durations. For example, Exxon Valdez and Deepwater Horizon are both oil spills, although the duration of the Exxon Valdez oil spill was quick relative to Deepwater Horizon. The term slow-motion technological disaster refers to a long duration, contrasting to the swift time-span of other technological disasters such as radiation leaks, oil spills and fires. Cline et al. (2010) conceptualize Superfund sites as slow-motion technological disasters due to the delayed impacts consistent with exposure to hazardous substances.

My aim is not subscribing to one conceptualization over another. Rather, the discussion surrounding categorization of natural and technological disasters and the duration of disasters are significant considerations when framing the investigation of a particular disaster’s impacts on affected communities in contemporary society. More important, the specific context of the disaster and the community are more meaningful than how nicely the disaster fits into certain categories based on the type and duration because “resilience can only be understood with regard to a specific (systemic) entity and its external environment” (Lorenz, 2010, p. 4).

Resilience

Several scientific fields conceptualize resilience many ways. The diverse use of the term, even within disaster research, makes the need for a contextually specific definition all the more necessary. Resilience typically refers to a process in the

community post-disaster (McGinn & Spindel, 2007), although this has been contested in the resilience literature. Distinguishing between what resilience is and is not enhances understanding of the concept. Previous research differentiates between resilience and recovery (Bonanno, 2004; Norris et al., 2008) as well as resilience and resistance (Norris et al., 2008). Resilience does not merely end at stability and capacity (Magis, 2010), but moves beyond to arrive at adaptability. Stability does not include an element of change, and change is fundamental to the concept of resilience (Norris et al., 2008). Resilience does not signify merely returning to a functional status that existed prior to a disaster, but rather to improve compared to the pre-disaster state. In addition, some contexts may make the return to a pre-disaster state of functioning impossible. Resilience then becomes more about adapting to conditions created by the disaster to arrive at a functional state fundamentally different from the pre-disaster state, or transformation (Magis, 2010). Commonly, definitions of resilience in the disaster literature include the elements of vulnerability and adaptive capacity. Adaptive capacity is synonymous with adaptability in the present study.

Vulnerability

Some researchers conceptualize vulnerability as the alternative outcome to resilience. Norris et al. (2008) expanded on this view and posited that the trajectory from vulnerability leads to persistent dysfunction. Qualities of both vulnerability and resilience are a part of urban ecosystems (Gotham & Campanella, 2011). The capacity of a community to adapt to hazards is “influenced by economic, demographic, and housing characteristics” (Cutter, Boruff, & Shirley, 2003, p. 243). The resulting vulnerability stems from social and place inequalities (Cutter et al., 2003).

Furedi (2007) offers a different conceptualization of vulnerability. This conceptualization calls for a shift in emphasis in disaster research from resilience to vulnerability in order to incorporate an ecological perspective on disasters (Furedi, 2007). Also Furedi (2007) claims, “Vulnerability is not a state of being that emerges in response to a disaster – it is something that precedes it” (p. 488). This conceptualization of vulnerability as a pre-disaster condition is the one used in this study. The alternative outcome to resilience is either movement toward resilience or dysfunction.

Adaptability

Adaptability, adaptive capacity and adaptation are concepts central to the literature on disaster research, and particularly critical to the concept of resilience at the individual, family and community levels. Norris et al. (2008) describes adaptation as wellness and networked adaptive capacities that achieve resilience on the community level. The researchers indicate not only the importance of resources, but also the changing nature of these resources with regard to adaptive capacities. “We might say that capacities become adaptive capacities when they are robust, redundant, or rapidly accessible and thus able to offset a new stressor, danger, or surprise (Norris et al., 2008, p. 136).” Lorenz (2010) posits, “the enhancement of adaptive capacity involves mainly a decrease in resource dependence” (p. 8). While investigating natural resource dependence in communities using social resilience as a conceptualization, Larsen et al. (2011) found that respondents felt the community needed to capitalize on their dependence on tourism to adapt to variable economic and environmental conditions.

Community Resilience

Norris et al. (2008) provided the theoretical piece that has contributed to an understanding of community resilience as a social phenomenon, synthesized from

several disciplines with a focus on the disaster context. Norris et al. (2008) defined community resilience as a set of four capacities, economic development, social capital, information and communication, and community competence. Sherrieb et al. (2010) focused on two of these four capacities, economic development and social capital. Prior to their work, researchers had generated indicators of resilience, but never tested them. Sherrieb et al. (2010) used publicly available data to identify indicators for these constructs and generated and validated indices based on those indicators. The researchers created an instrument to measure the economic development and social capital capacities of community resilience.

I narrowed the focus of my research to community resilience. However, a community as a whole cannot collectively respond, thus I interviewed individuals and used archival data in my research. The distinction here is that I was not interested in individual mental health outcomes. The contribution of individual outcomes to community resilience is undeniable because individual, family and community resilience are intermingled. Nonetheless, the main interest of the present research was to investigate the adaptive capacity of a community to transform after a disaster in the face of adversity.

The primary context of interest is disaster, but the literature that focuses on health outside of the disaster context also provides important contributions to community resilience. The context of health inequalities in communities is especially important. Since the natural and technological disaster dichotomy is nebulous, I reviewed relevant community resilience literature from examples of both natural and technological disasters. Norris et al. (2008) reviewed literature about community

resilience with regard to mental health, effective organizational behavior, and disaster management. Measurement of resilience occurs at the individual, family and community levels. Social, ecological and physical perspectives all provide frameworks for resilience. Norris et al. (2008) identified community resilience as a metaphor, a theoretical perspective, a set of adaptive capacities and a means of disaster preparation and mitigation. Exploring community resilience is important because there is ample substantive research about resilience at the individual and family level, while studies at the community level are at preliminary stages and evolving.

The main theoretical standpoint I took was the social-ecological perspective that includes transformability as a possible outcome of community resilience (Magis, 2010). I discuss social processes relevant to the social-ecological perspective, including social capital, since themes of capital emerged in my data analysis. According to Pierre Bourdieu, economic capital influences all other forms of capital and is the most robust influence on propagation of class-based inequalities (Allan, 2007, p. 413). I also briefly discuss conflict theory and William Julius Wilson's structural inequality theory because all three theoretical perspectives used to explain community resilience overlap with respect to some of their fundamental concepts.

Three theoretical perspectives are prevalent in the research explaining disasters and community resilience. These perspectives are conflict, structural inequality and social-ecological theories. My discussion of conflict theory focuses on its foundations. In conflict theory, civic participation can cause conflict among citizen participants and between authority figures and citizens. My structural inequality and social-ecological

discussions focus on the relations of these perspectives to the community resilience literature.

Conflict Theory

Conflict theory views conflict as a driving force for social change to take place. This perspective grew out of and as a response to structural-functionalism and has its foundations in Karl Marx's work (Ritzer, 2010). Georg Simmel claims that conflict not only creates disunity, but can also create solidarity among people. According to Simmel (1964), "conflict is more the occasion of unifications which are required internally than it is the purpose of these unifications" (p. 101). He discusses two different kinds of unifications: (1) people who are acquainted with each other and share a common interest or aversion to a third party and (2) people who are not acquainted with each other and share the same level of education or sensitivity towards certain behaviors (Simmel, 1964).

Two key causes of conflict are the unequal distribution of scarce resources and emotional attachment. According to Lewis Coser, conflict intensity and group intimacy have a direct relationship. The group is a structure affected by conflict (Kivisto, 2010). More interactions and involvement in close groups have a direct relationship with an inclination to quell conflict (Kivisto, 2010). Violence occurs when more intense emotional involvement and transcendent goals are aspects of the conflict. Transcendent goals extend beyond the scope of daily life (Allan, 2007). Conversely, when the group makes rational goals explicit, violence is less likely (Allan, 2007). Functionality in the conflict has a direct relationship with increased violence (Allan, 2007). "Violent conflict also tends to produce *coalitions* with previously neutral parties (Allan, 2007, p. 220)." The

social change resulting from conflict has complex repercussions. Different groups of people experience and perceive the outcomes of the change differently.

Internal and external conflict is an important dichotomy in conflict theory. Internal conflict happens among different groups that belong to the same social system (Allan 2007). "In Coser's theory, there are two basic *types of internal conflict*: those that threaten or contradict the fundamental assumptions of the group relationship and those that don't (Allan, 2007, p. 218)." The conflict has more functionality if the group assumptions are not threatened and if the group structure has lower network density, meaning less involvement of group members with each other (Allan, 2007). According to Coser, internal conflict has three potential outcomes, group solidarity, destruction of relations between groups, or using tensions for a constructive outcome (Kivisto, 2010). The social structure that the conflict is taking place in strongly predicts the potential outcome (Kivisto, 2010). Multiple conflicts and multiple group affiliations result in participation by the same individual in multiple conflicts simultaneously. Participation in multiple conflicts balances the social structure (Kivisto, 2010). External conflict occurs at the scale of nations at war. Behavior, ideologies and cultural representations are examples of boundaries that distinguish groups. These boundaries become more robust as groups experience more conflict (Allan, 2007). Conflict also has a direct relationship with increased group internal solidarity, or a greater sense of camaraderie (Allan, 2007). The power structure of the group becomes more central and efficient as groups face conflict (Allan, 2007, p. 220).

Ralf Dahrendorf distinguishes between power that comes from persuasion and brute force, and power that comes from authority (Allan, 2007). "Power is something

that can be exercised at any moment in all social relations and depends mostly on the personalities of the individuals involved (Allan, 2007, p. 223).” Authority is not part of the individual personality, but part of social organization where, “the legitimated use of power is found in status positions, roles, and norms of organizations” (Allan, 2007, p. 224). Persuasion is a feature of the individual personality that can surface through manipulative interactions (Allan, 2007). Dahrendorf’s primary focus is on class conflict and the negative implications of conflict, more so than Coser (Kivisto, 2010).

Dahrendorf’s main point about authority is that it exists in positions held by individuals, not individuals themselves (Ritzer, 2010). Additionally, Dahrendorf sees authority as the major determinant of potential conflict (Kivisto, 2010).

Structural Inequality

Structural inequality grows out of Marx’s thought and critical race theory. Wilson drew from Marx and conceived different theoretical frameworks in distinct historic periods. Contemporary society reflects a class-state inequality, where the importance of class outweighs race (Allan, 2007). The selection of demographic variables reflects the presence of this perspective in the community resilience literature. For example, researchers have used aggregate demographic characteristics of communities to describe community resilience. Sherrieb et al. (2010) generated indicators of community resilience based on the adaptive capacities of economic development and social capital identified by Norris et al. (2008).

The adaptive capacity economic development, identified by Norris et al. (2008), has foundations in structural inequality since it comprises “the level of economic resources, the degree of equality in the distribution of resources, and the scale of diversity in economic resources” (Sherrieb et al., 2010, p. 229). There also is a link

between economic development and conflict theory because inequitable distribution of scarce resources is a major source of conflict. Furthermore, "...economic development depends on the economic structure of a community and the interconnectedness of the capacities that support and are supported by that structure" (Sherrieb et al., 2010, p. 229).

The community resilience literature offers another example of this perspective through the discussion of inequalities in health outcomes. The unequal spatial distribution of populations by characteristics of race and class results in unequal health outcomes. Those who live in close proximity to built structures, such as power plants and chemical refineries, are more vulnerable to diseases resulting from the toxic substances such structures release. Structural characteristics of neighborhoods can have an impact on well-being. According to Mykota and Muhajarine (2005), "the existence of structural characteristics in neighborhoods is found to facilitate social and interpersonal processes among residents, thereby enabling resilient mechanisms in neighbourhoods to develop" (p. 11).

Historically, some cities and towns became dependent on one or a few industries over time. These industries once boomed in the industrial age, although ultimately experienced a downturn. "On the economic level, cities or regions that are highly dependent on a few major industries or products are more *structurally vulnerable* to shifts in market demand or changes in manufacturing practices than more diversified economies are (Draus, 2009, p. 362)." Hobfoll's conservation of resources model (COR) posits economic diversity in a community contributes to community resilience. The ecological-symbolic approach to disasters offered by Kroll-Smith and Couch and the

social-ecological perspective also subscribe to the idea that dependence on one or a few major industries can be detrimental to a community's well-being.

Social-Ecological

Social resilience and ecological resilience are distinct resilience concepts, but they are not mutually exclusive. According to Adger (2000), "ecological and social resilience may be linked through the dependence on ecosystems of communities and their economic activities" (p. 347). Institutional structures link these different types of resilience because they "govern the use of natural resources creating incentives for sustainable or unsustainable use" (Adger, 2000, p. 348). Adger (2000) asks whether increased dependence on resources and ecosystems in a society decreases that society's resilience. This assumption underlies Lee and Blanchard's (2012) combination of the social-ecological and COR perspectives to examine community attachment in the context of oil spill affected communities that depend largely on oil as a resource.

Holling (2001) discusses how complex systems of people and nature depend on processes to maintain the systems' self-organization. This self-organization, "characterizes the development of complex adaptive systems, in which multiple outcomes typically are possible depending on accidents of history" (Holling, 2001, p. 391). These complex adaptive systems have an evolving nature that is described by the concept panarchy, "a hierarchical structure in which systems of nature..., and humans..., as well as combined human-nature systems...and social-ecological systems..., are interlinked in never-ending adaptive cycles of growth, accumulation, restructuring, and renewal" (Holling, 2001, p. 392). These transformational cycles range in scale from the micro to the macro and the duration ranges from days to eons. Panarchy is the amalgamation of adaptive cycles and hierarchies of space and time

(Holling, 2001). Holling (2001) claims understanding critical points on these scales means identification of where a system's ability to transform is and when a system is vulnerable. This understanding makes using, "those leverage points to foster resilience and sustainability within a system" (Holling, 2001, p. 392) feasible.

Some Strengths and Weaknesses of Conflict Theory, Structural Inequality and the Social-Ecological Perspective With Regard to Community Resilience

Conflict theory strengths

- Superfund site cleanup process typically centers around a major conflict in a community near the site location
- Accounts for structural aspect of conflict generation

Structural inequality strengths

- Researchers from many disciplines, including but not limited to public health, education, food security and disasters, use this perspective widely
- Structures are important to the explanation of social phenomena from the conflict and social-ecological perspectives

Structural inequality weakness

- This perspective only addresses structural differences as a possible explanation of social phenomena and overlooks interpersonal influences on behavior

Social-ecological strengths

- This perspective represents the latest shift in thought about disaster
- Combines two types of resilience that lend themselves to their already embedded nature
- Acknowledges complexities of adaptive systems and their nested, scalar nature

Social-ecological weakness

- Does not address conflict beyond a potential cause for a system to become maladaptive

The present study addresses community resilience in the context of the social implications resulting from the CK Superfund site. Impacts from the slowly unfolding

disaster on resources and the economy in the local community have been substantial. The impacts resulting from the designation of the CK Superfund site through today represent the repeated shocks sustained by the SF community over time. The present study posits the community resilience process rests in the events unfolding over time, and their resulting impacts on the SF community.

Key Concepts and Constructs of the Social-Ecological Perspective

Social Capital

Researchers conceptualize social capital in the extant literature robustly. According to Bourdieu, there is a link between social capital and class. This link stems from Marxist thought (Allan, 2007). Economic capital, such as income, directly affects all other forms of capital, whether it is social, symbolic or cultural. Social capital includes elements of intention and chance. Therefore, social capital is conceptually independent from economic capital effects (Allan, 2007). Different contexts result in social capital taking on different forms, “it may be more useful to think in terms of different types of social capital, recognizing that not all forms will be present or equally important in communities” (Kirmayer et al., 2009, p. 75). Structural inequality potentially determines the expression, or lack of expression, of social capital in a given community, “the building of new communal facilities, may be insufficient if the community still has unequal access to employment, education, lobbying power, and other important resources that may have an equal bearing on social capital” (Kirmayer et al., 2009, p. 76).

“Community resilience is developed through the engagement of all the capitals (Magis, 2010, p. 410).” For the present study, social capital is of particular focus because of its prevalence to community resilience in the disaster literature. Social

capital refers to the social network membership of an individual (Allan, 2007; Putnam, 2000). This membership results in trust and norms of reciprocity that facilitates citizen and institutional collective action (Putnam, 2000; see also Coleman, 1988; Perkins, Hughey, & Speer, 2002). Individuals participate in social networks informally and formally (Perkins et al., 2002). An example of informal participation is lending something to a neighbor, while an example of formal participation is organizational involvement. The following definitions are of the different forms of capitals because they relate to each other and they may affect the community resilience process.

According to Magis (2010), “three types of social capital are important for community resilience: *bonding, bridging, and linking*” (p. 407).

- Bonding capital – a type of social capital signified by close, personal ties that foster cohesion through trust and norms of reciprocity; trust and reciprocity reinforce the ties; these relationships tend to be primarily homogenous (Magis, 2010; Perkins et al., 2002; Putnam, 2000)
- Bridging capital – a type of social capital characterized by relationships between networks; these relationships incorporate diverse networks and are contingent upon shared resources (Perkins et al., 2002; Putnam, 2000)
- Linking capital – According to Magis (2010, p. 407), linking capital “focuses on vertical relationships between groups and those with power or authority” (as cited in Woolcock, 2000); these relationships are usually heterogeneous

Uphoff (2000) categorizes social capital into structural and cognitive. Structural social capital implies the concepts of structure and social capital are embedded, yet structure is distinct from the cognitive dimension of social capital. Both categories refer to a unit beyond the individual, such as a community (Kirmayer et al., 2009; Uphoff, 2000).

- structural – refers to social organization and networks (Uphoff, 2000)
- cognitive - refers to norms, attitudes, values and beliefs (Uphoff, 2000)

- Economic/Financial Capital – “the financial resources available to be invested in the community for business development, civic and social enterprise, and wealth accumulation” (Magis, 2010, p. 406-7)
- Built/Physical Capital – “a community’s physical assets and built infrastructure, for example, machinery, homes, office buildings, schools, roads, sewers, factories, and water systems” (Magis, 2010, p. 407)
- Environmental Capital – “includes several aspects of a community’s base of natural resources: air, water, land, flora, and fauna” (Green & Haines, 2012, p. 213)
- Natural capital – natural resources and ecosystem services (Costanza et al., 1997; Goodman, 2003; Magis, 2010)
- Human capital – “refers to individuals’ innate and acquired attributes, whether they are latent or manifest” (Magis, 2010, p. 406)
- Cultural capital – “refers to people in social groups...reflects communities’ ways of knowing the world, their values, and their assumptions about how things fit together. It is represented by symbols in language, art, and customs” (Magis, 2010, p. 406)
- Political capital – access to decision making (Green & Haines, 2012)
- Instrumental capital – “consists of resources that actors can use to influence policies in their own interest” (Green & Haines, 2012, p. 239)
- Structural capital – “attributes of the political system that shape participation in decision making” (Green & Haines, 2012, p. 239)

Place Attachment

According to Altman and Low (1992), the definition of place attachment is, “an affective bond between people and places. It includes different actors, social relationships, and places of varying scale” (as cited in Manzo & Perkins, 2006, p. 337). “Place attachment refers to an emotional connection with a place (Bajayo, 2010, p. 11).” The experiences community members have day-to-day may not necessarily match up to their perception of their ideal living space, thus challenging their ideal perception (see Manzo, 2003, 2005). Disruption of place attachment occurs from community

development projects, disasters, crime and relocation (Manzo & Perkins, 2006).

Disruptions to place attachment potentially divide the affected community and diminish community resilience (Manzo & Perkins, 2006; Norris et al., 2008). Despite this potential outcome, sensitivity to the place attachment of community members can, “help mobilize citizen participation to rebuild a community” (Manzo & Perkins, 2006, p. 338).

Community Attachment

Researchers distinguish between characteristics of individual-level and community-level place attachment. On the community-level, the emotional connection to place originates from internal as well as external processes (Manzo & Perkins, 2006). Manzo and Perkins (2006, p. 338) cite Riger and Lavrakas' (1981, p. 55) identification of the attachment dimensions of social bonding, “feelings of being a part of one’s neighborhood” (Manzo & Perkins, 2006, p. 338) and physical rootedness to the community. Riger and Lavrakas (1981) use the term community attachment to refer to collective characteristics of attachment. In their literature review, Lee and Blanchard (2012) provide evidence of the association between community attachment and well-being with studies using the terminology sense of community, sense of neighborhood and sense of neighborhood attachment. For these reasons, the term community attachment is synonymous with sense of community in the present study.

Sense of Community

Place attachment is a characteristic of individuals associated with positive individual well-being, specifically, an emotional connection to the physical place. Sense of community, however, refers to a connection to the social aspects of the community. Researchers distinguish between place attachment and sense of community (Bajayo, 2010; Manzo and Perkins, 2006; Norris et al., 2008). The difference between sense of

community and place attachment is subtle, although fundamental. The two constructs have distinct contributions to community resilience.

Aspects of sense of community include a focus and concern for issues and people in the community (McMillan and Chavis , 1986; Norris et al., 2008; Perkins et al., 2002). According to Perkins et al. (2002), sense of community and trusting neighbors are synonymous. Researchers identify the following characteristics of sense of community, shared history, social connections, mutual concerns, common symbols and local traditions (Fisher and Sonn, 2002; Landau and Weaver, 2006; Perkins et al., 2002).

Collective Action/Citizen Participation

Collective action is critical to investigating community resilience because social capital facilitates collective actions on the citizen and institutional levels, both formally and informally (Coleman, 1988; Perkins et al., 2002; Putnam, 2000). According to Norris et al. (2008), “citizen participation is widely believed to be a fundamental element for community resilience” (p. 139). Participation and sense of community have a reciprocal relationship (Perkins et al., 2002, p. 38). A definition of citizen participation is the involvement of community members in formal as well as grassroots organizations that may include but are not limited to: “school-based associations, citizen advisory boards of government agencies, and youth sports and recreation groups; community councils, resident associations, and community crime and drug prevention coalitions; and self-help groups” (Perkins et al., 2002, p. 40). I argue collective action is contingent upon citizen participation. Also, citizen participation refers to the individual level of analysis, while collective action refers to the collective level of analysis. Since I measured

community characteristics on the individual level, I consider the relationship between citizen participation and collective action reciprocal.

There is a connection between collective efficacy and collective action, and citizen participation (Norris et al., 2008; Perkins et al., 2002). According to Norris et al. (2008), collective action can build either consensus, such as the formation of grassroots community groups mobilizing political capital, (see Edelstein, 1988; Oliver-Smith, 1986) or discord, such as community conflict and mistrust creating barriers to action in the community (see Edelstein & Wandersman, 1987; Kaniasty & Norris, 2004). “Which outcome occurs is not necessarily predictable but may depend on the extent of collective efficacy, the process of empowerment (vs. disempowerment), and the nature of political interaction (adversarial versus collaborative) (Norris et al., 2008, p. 141).”

Collective Efficacy/Empowerment

Aspects of collective efficacy and empowerment include attitudes about organizations and formally organized behaviors. According to Perkins et al. (2002, p. 37), “empowerment is about the development of a sense of collective efficacy, or control over the institutions that affect one’s life.” They also identify empowerment, which they define as the belief in the efficacy of collective action as an individual-level cognitive component of social capital. Empowerment correlates with sense of community (Perkins et al., 2002). Norris et al. (2008) place collective efficacy and empowerment as being a characteristic of the networked adaptive capacity community competence, not social capital. Regardless of the best fitting categories, the belief that citizen participation with institutions, a form of collective action, is a worthwhile effort, characterizes empowerment and collective efficacy. While collective action is important, collective efficacy is necessary to empower community members to take effective action

continually. Collective efficacy and empowerment are interchangeable terms in the present study.

Social Support

Researchers identify the primary links between community attachment and health as social support and social influence (Lee and Blanchard, 2012; Norris et al., 2008). Social support is a community-level protective process of social ties that act as a buffer against adverse outcomes resulting from hardships (Ahmed et al., 2004; Hernandez, 2002; Hill & Madhere, 1996; Norris et al., 2008; Sonn & Fisher, 1998). Norris et al. (2008) distinguish between actually receiving help, received support, and the belief that help is available if needed, perceived support. Both kinds of social support vary by source. Also, the kinds of social support vary by the groups providing support, and the type of support, emotional, informational and tangible (Norris et al., 2008). Examples of traditional sources of social support include family and friends. Community conflict over the existence of the disaster impeded previously existing common social support systems in the case of the Libby, MT community (Cline et al., 2010).

Vulnerability, Risk and Trust

Norris et al. (2008) conceptualizes the alternative outcome to resilience as persistent dysfunction resulting from vulnerability. The present study defines vulnerability as a condition of a given community existing prior to the traumatic event. The two related concepts are perhaps antonyms, although a causal relationship is not clear (see Adger, 2000; Norris et al., 2008).

Closely related to vulnerability, adaptive capacity and the different kinds of capital (see Parkins & MacKendrick, 2007) is the concept of risk. According to Parkins and

MacKendrick (2007), “individuals who perceive and risk or vulnerability are more inclined to act in ways that will mitigate the risk” (p. 462). Parkins and MacKendrick (2007) found that the more risk awareness in a community, the more adaptive capacity in that community. The different kinds of capital tie into the connection between adaptive capacity and community capacity since community capacity is the community’s collective ability, “to combine various forms of capital within institutional and relational contexts to produce desired results or outcomes” (Beckley et al., 2008, p. 60).

Trust is another concept critical to community resilience. Rusch (2010) examines bridging social capital and how the concepts of risk and trust interact within the context of community organizing. In discussing the political implications of social capital that have to do with the nature of relationships within a network, Rusch (2010) offers a perspective taking into account the costs and benefits of network membership. According to Lebel et al. (2006), “the capacity to build networks of trust appears to be fundamental to the kinds of self-organizing collective action needed to manage resilience” (p. 8). Yet, the benefits of network membership, “may be married to problematic obligations and in the whole may perpetuate inequalities” (Rusch, 2010, p. 485). Rusch (2010) found that bridging social capital, “must be able to take root in the absence of generalized trust” (p. 495). Rusch (2010) posits, “particular contacts do not need to trust the entire network to participate: they just need to have enough confidence in the bridging mechanism to be further introduced to others in the network” (p. 496). Rusch (2010) found an inherent sense of trust present in the bridging mechanisms even though interview respondents did not mention trust explicitly. Also, trust connotes unwavering confidence and, “is not static but evolving, and trust is as much a result of

collaboration as a precursor to it” (Rusch, 2010, p. 498). “While an organizer necessarily builds interpersonal trust in the process of building networks, his or her real goal is to build a community’s political capacity (Rusch, 2010, p. 498).”

Conceptual Framework

This study redirects the focus from the macro-level conceptual thinking about community resilience to disasters, such as Williams’ post-social perspective (Williams, 2008) to study specific community level responses. Macro-level conceptual thinking is important to disaster research, although my primary concern is that the increasing complexity of the thinking around disaster research confounds practical investigation. If Williams (2008) is correct about the need for a reconnection between society and environment in disaster research, theories and theoretical constructs exist that can guide investigation of community resilience processes, such as conflict theory and structural inequality. Potentially, new theoretical frameworks are not necessary to understand community resilience. Literature relevant to community processes surrounding environmental inequality provides a rationale for the conceptual framework of the present study.

The literature concerning environmental inequality typically centers on an agenda of social justice, particularly with respect to inequities in health outcomes. According to Smith (2009), “this literature is increasingly sophisticated in underscoring the numerous forms of pollution that are more likely to be located in poor and minority neighborhoods, yet the mechanisms and processes explaining these outcomes remain in dispute” (p. 681). Smith (2009) acknowledges that previous studies about environmental inequality lack a theoretical basis and compares Wilson’s ideas about economic deprivation to Massey and Denton’s explanation of racial segregation. Smith (2009) acknowledges

these schools of thought overlap, although he found Wilson's perspective has greater explanatory power with respect to social inequality in the context of Superfund sites. The present study draws from the social-ecological perspective to guide the inquiry into the community resilience process. The panarchy model provided by Holling (2001) illustrates the set of adaptive cycles subscribed to in this study.

The community resilience literature is abundant, although considerable opportunity for discovery remains. The community literature offers a robust and diverse collection of conceptualizations, although researchers generally agree about what factors foster resilience in communities. For example, culture and community contributes to resilience (Kirmayer et al., 2009). There are several potential indicators of resilience and the ways in which the indicators interact are complex. Different researchers have distinctive ideas about what constructs indicate resilience and what items best represent these indicators. Some researchers propose indicators and items, but few test or assess their validity. An opportunity exists to refine community resilience conceptually and arrive at a common set of constructs and indicators. The first step in more effective and systematic fostering of community resilience is the refinement of community resilience measurement. Moving beyond mere abstraction and conceptualization of community resilience is critical to its application in disaster-affected communities.

The fundamental concepts in the community resilience literature overlap. For example, vulnerability, adaptability and resilience closely link and overlap. The natural versus technological disaster dichotomy in the community resilience literature merged over time, although evidence remains of some fundamental differences regarding

community impacts and responses. Social capital has different and extensive conceptualizations. Primarily, the literature identifies bonding, bridging, linking types of social capital, and cognitive and structural social capital. The conceptual debate about what contributes to community resilience centers on the distinguishing characteristics of these constructs.

Researchers argue community resilience as a process is a superior conceptualization to that of an outcome (Norris et al., 2008). This argument led me to assume that community resilience has distinct outcomes at different points in time. These outcomes culminate in a process. The literature I reviewed led me to the general inquiry of whether resilience developed in the SF community in the face of repeated shocks from the CK Superfund site. More pointedly, I examined how context and the nature and extent of the relationship between constructs contribute to resilience. Finally, I tested the credence of the idea that community resilience is a process of distinct resilient outcomes over time.

CHAPTER 3 METHODOLOGY

Research Questions

My overall research question was whether resilience developed in the SF community in the face of repeated shocks from the Cabot-Koppers Superfund site. I addressed three explicit research questions. (1) How does community context affect the development of community resilience? (2) To what degree does social capital, place attachment, sense of community, collective action, collective efficacy/empowerment, social support, vulnerability, risk and trust contribute to community resilience? (3) Does resilience evolve and change over time, or is it an outcome measurable at a single point in time?

Research Design

The theoretical population for this study was communities in the United States affected by Superfund sites. The accessible population was the SF community in Gainesville, FL, affected by the CK Superfund site. The distinction between the chronic environmental impacts of Superfund sites from other types of disasters led me to my choice of the theoretical population. The devastation from Superfund sites has an impact on the well-being of communities slowly over time, as evidenced in the cases of Libby, MT and Oak Ridge, TN (Cline et al., 2010; Harper, 2007; Mix & Shriver, 2007). I do not propose that communities affected by Superfund sites experience any greater or lesser impacts than communities affected by other kinds of disasters. In fact, all communities may undergo distinct impacts and resulting outcomes following any disaster.

I used a retrospective longitudinal case study design for this research due to the complex nature of the social phenomena. Multiple case designs are generally stronger than single case designs. However, Yin (2009) discusses five rationales for choosing a single-case design, one of which is the need to understand a complex process over an extended period. In this case, I chose a retrospective longitudinal design. I chose a longitudinal design because, “The theory of interest would likely specify how certain conditions change over time, and the desired time intervals would presumably reflect the anticipated stages at which the changes should reveal themselves” (Yin, 2009, p. 49). The design consisted of two stages, the first drew upon archival data and the second relied on personal interviews.

The archival data were longitudinal. I drew upon newspaper articles, government documents and other sources published since 1983. I used the archival data in three ways. First, I constructed a timeline of events. Second, I identified individuals to interview who were involved in the events from the initial site listing in 1983 to present. Third, I used these sources to identify themes that emerged during the unfolding story of CK over time. The archival documents used in the data analysis included newspaper articles and letters to the editor from the *Gainesville Sun*, the *Friends of Alachua County Talk*, and the *Iguana*. I also reviewed minutes from neighborhood association, city and county commission meetings, and official government records. I used the minutes and government records primarily to guide the construction of a timeline. The archival sources repeated many of the same events assembled in the timeline and I did not exhaustively cite every source that mentioned the same event. I only cited one source for each event included in the timeline unless another source provided me with

additional information about the same event. I asked interview respondents to identify the points they felt were key with regard to the issue unfolding over time. Consensus among respondents about regarding key points guided my choices of key events in the timeline.

The interviews provided a deeper understanding of community processes. The information gained from the interviews was retrospective in nature. I was able to ask people what they remembered about events, how they felt at different points in this historic process, and how they and others responded to events. However, all retrospective data reliant on people's memories are somewhat unreliable because the human mind filters information, especially over time. Later events and emotions also affect how we remember earlier events. These limitations apply to my data.

Using a mixed method approach improved my understanding of community resilience and more robustly addressed my research questions. The archival documents allowed me to understand the events that occurred and who was involved in those events. The interviews gave me insight into the nature of people's involvement, their feelings, and how they assessed those events. I followed Braun and Clarke's (2006) approach: "What is important is that the theoretical framework and methods match what the researcher wants to know, and that they acknowledge these decisions, and recognize them as decisions" (p. 80). Both methodological stages were necessary to investigate all constructs of interest to community resilience. Using a two-stage approach ensured the most holistic explanation of community resilience possible.

Archival Sample Selection

The sample of newspaper articles consisted of 263 articles, 238 from the *Gainesville Sun*, 20 from *Friends of Alachua County Talk*, and five from the *Iguana*.

Limiting the articles used in the final data analysis was necessary because there is a great deal of information about the CK site, most of it not valuable in answering my research questions. I therefore limited the articles to those that provided information of specific relevance to my research. Bryman (2008) discusses the issue surrounding samples of archival documents: “Representativeness is rarely an issue for analyses of newspaper or magazine articles, since the corpus from which a sample has been drawn is usually ascertainable, especially when a wide range of newspapers is employed...” (p. 525).

I searched digital and physical newspaper archives in the Alachua County and University of Florida libraries and the Gainesville Civic Media Center. The digital search key words I used were “Superfund,” “Cabot,” “Koppers,” “Cabot Koppers” and “Cabot Koppers Superfund.” The physical archive I used was the Alachua County library card catalog that contained a category entitled “Alachua County – pollution.” I examined each entry and noted the articles about the CK Superfund site. I created spreadsheets for all articles by source and organized the articles chronologically within each spreadsheet.

I established criteria for the final selection of articles to include in the data analysis. (1) The article had to describe community processes and go beyond background information to make statements or provide an author’s perspective about the subject of the article. This selection included articles written from or describing the perspectives of stakeholders involved in the CK events, such as government officials and activists. I included articles that described relevant actions, such as writing letters or reactions to events, demonstrations and comments made at public meetings. Additionally, articles included not only described the events themselves, but also

expressed the different perspectives in the community. (2) At least 75% of the article had to address the CK site in it. Using these criteria allowed me to identify sources that would provide rich information about social processes in the community.

I anticipated the government documents and neighborhood association, city and county commission meeting minutes to be useful in thematic analysis, but this proved incorrect based on the criteria I established. Nonetheless, I did find valuable information in minutes of neighborhood association meetings and town meetings and official government documents. I used these sources to identify potential interview respondents and events to include in the timeline. The only publicly available minutes of neighborhood association meetings were on a blog ("Stephen Foster," 2009) published from 2003 to 2009. I examined all postings to this blog. They consisted largely of notices and summations of decisions made in association meetings. They do indicate issues facing the neighborhood, including the Superfund site, but the discussion is not substantive. I acquired minutes of town hall meetings from the City of Gainesville archives and examined those from 1983 to the present. I acquired official government documents, mostly EPA and municipal documents, from the Alachua County Public Library. While these documents were scientific and technical, they were very helpful in identifying potential interview respondents because they included names and full contact information.

Interview Sample Selection

I obtained the sample of interview participants using a referral sampling procedure. I identified initial interviewees through the archival documents such as local community members and government officials. First, I identified community members, community leaders and government officials through the archival documents. Second, I

asked each of these interviewees to identify three individuals they felt would make good interview subjects, based on their involvement in or familiarity with the Superfund site. I repeated this referral procedure until the following conditions occurred: (1) the same names of individuals provided as referrals were recurrent, (2) the interview subjects failed to provide new knowledge and ideas surrounding the events and community processes with respect to the CK Superfund site or (3) the respondents knowledge of events and processes surrounding the CK Superfund site decreased. The term saturation describes when no new additional information is forthcoming. Richards (2005) states, "if the data records and the categories coming out of the data are well handled, both will stop expanding" (p. 135). I only interviewed people who had lived in the community for at least five years because the duration of the cleanup process has continued for 30 years. Someone who lived in the community less than five years likely did not have extensive personal experience needed to provide the kind of information of interest to the present study.

Descriptive Characteristics of Respondents

The respondents were from the most affected SF neighborhood and people from other neighborhoods that were involved in the issue, as well as activists and government officials. The purpose of interviewing these different groups of people was to represent all potential perspectives. I contacted 55 people by phone or e-mail, or both if available, to request an interview. Following normal protocol, I made attempts to contact each individual three times. Seven people declined altogether and 19 people did not respond at all. Two people forwarded my request to other people and two people that agreed initially did not follow through with the final scheduling of the interview. The total interview sample size totaled 25.

I was not able to obtain contact information for all potential respondents. I used both public sources of contact information (e.g., Internet, phone book) and asked individuals involved with and knowledgeable about the CK Superfund site for contact information. I made a spreadsheet of the names of people taken from the archival sources. I made a separate spreadsheet for the names of referrals. Although I asked for three referrals from each respondent, some respondents provided me with more than three names. This can occur if individuals with one perspective provide many referrals while individuals with differing perspectives provide few. Most respondents provided referrals with diverse viewpoints, not just people who shared their viewpoints or involvement in the issue. There were at least three tiers of respondents in the referral process. I achieved saturation, but racial diversity was low.

I crosschecked the information provided by each interviewee by sending a summary to the respondent. They replied with comments and changes if needed. Interviewing at least one respondent in order to truly equally represent all perspectives was impossible and not necessarily vital to answering the research questions. Getting the full explanation of events was the primary objective of the interviews. The information amassed was more than sufficient to gain the full explanation of the unfolding story over time.

Instrumentation

Community resilience as evidenced in the archival data dictated the variables, the larger themes and even larger categories of measurable interest to include in the interview instrumentation, and the general development of the interview protocol. The interviews served to explore the constructs and their underlying themes more in-depth that are not apparent in the archival data. Questioning participants about social

processes in the community made the exploration of constructs possible. This mixed methods approach was more preferable to one method alone because this approach offered a more robust explanation of community resilience.

The interviews were semi-structured. The semi-structured approach allowed me to ask probing questions in order to maximize the information that respondents provided about community processes that took place as a result of the CK Superfund site. This approach also allowed me to eliminate questions that did not generate discussion and add questions based on information I gained from preceding interviews. See Appendix A for the interview guide.

I tested the interview procedures prior to data collection. I cognitively tested the first draft of the instrument in the first few interviews. From that test, I minimally changed the instrument by adjusting some wording of questions. Some questions in the interview protocol were too long to say the entire question out loud word for word and requests to repeat these kinds of questions were common. Re-phrasing and summarizing the question worked the best for eliciting a response. After the instrument was tested with the first few respondents, the order of questions was changed to adapt to one of two ways one of the responses was anticipated to go for the 3rd question.

Data Analysis

Data analysis included four components. The first was the development of a timeline of events, based on the archival data. The second was an inductive analysis of the interview data and archival data from newspaper articles and letters to the editor. The third component was to use the themes derived in the inductive analysis to identify distinct phases in the unfolding process of the Superfund controversy. The final

component was to integrate the previous analyses to understand how the processes contributing to resiliency differed over time.

Timeline

I first identified all pertinent events in the archival data to create the timeline. An event refers to any action that occurred, ranging from release of government documents to demonstrations. I listed all of these events in a table and ordered them chronologically. The final timeline includes all events. The timeline served as a means of structuring the data systematically. This timeline was under continual development during the process of amassing all archival documents. The timeline demonstrates not only the complicated nature of the problem, but is also pertinent to and refers to the thematic data analysis.

Inductive Analysis

I employed the inductive approach to data analysis described by Thomas (2003). This approach does not rely on counting the frequency of the different themes that emerged. This approach allowed me to find differences and similarities with regard to emergent themes in the archival data, the interview data, and between the archival and interview data. Thomas (2003) describes the approach: "The primary purpose of the inductive approach is to allow research findings to emerge from the frequent, dominant or significant themes inherent in raw data, without the restraints imposed by structured methodologies" (p. 2). I collected archival data to look for expected theoretically based themes and emergent themes, such as contextual themes. Interview data expanded on both kinds of themes. The interview findings provided insider information that the archival data could not reveal. This made the investigation into community resilience

more robust by providing a more sophisticated explanation of resilience processes at work on the community level.

The process consisted of four procedures to ensure that I obtained a broad range of perspectives. The steps listed below indicate the different components of the procedure. The process was cyclical, not stepwise. I expanded and deepened data analysis continuously as new data became available. (1) I audio recorded interviews with consent of the participant. I also took notes during these interviews. I then summarized this information. I added details to these summaries when I listened to the audio recordings. The respondent verified these summaries to ensure accuracy of the information provided. This verification procedure also provided the interview respondent with the opportunity to provide me with additional information potentially recalled after the interview.

(2) I identified theoretical themes from the archival pieces and interview case summaries. Initially, I identified emergent themes from the archival pieces of data. Once I completed this initial identification for three or four archival sources, I compared what themes emerged across the pieces of data in cross-case comparisons. I repeated this step for both archival the interview data. For each archival document and interview summary, I wrote themes directly on the article. I included direct quotations, key statements, phrases and ideas to represent the theoretical derived themes.

(3) I completed a cross-case analysis for each theoretical theme. Cross-case analysis consists of comparing the themes that emerged across cases and which theoretical construct they represented. I selected documents published within two to three years of one another for each cross-case comparison. This procedure allowed me

to isolate what themes were significant during specific short periods of time in the unfolding process. Even when a theme was common to several cases, multiple perspectives may have been present. Examples of potential perspectives were positive, negative, ambivalent and unclassifiable. I organized the cross-case comparisons on a poster with sticky-notes color coded by the construct they fell under. I placed themes that did not fit under any of the constructs anticipated in a miscellaneous category. Some themes initially corresponded with multiple constructs. The resulting redundancy of themes allowed me to collapse themes as I reached higher levels of analysis.

(4) I listed common and different characteristics across responses for each perspective by theoretical theme. I completed this step for both the archival and interview data. I expected themes to emerge, other than the theoretically derived ones. This cyclical, on-going analysis allowed me to consider the themes that emerged as well as aggregate or eliminate the theoretically derived themes as I went along. In order to combat potential bias, two additional researchers completed the procedure three times to ensure my interpretations were not exclusively my own. I drew this technique from Thomas' (2003) example of consistency checks, "having another coder take the category descriptions and find the text which belongs in those categories" (p. 7). The measures I took to validate the conclusions I drew were the participant verification of the interview data described above and the outsider data analysis test runs. I used this technique of stakeholder checks to help ensure the reliability of my findings. I asked respondents to confirm interpretations and make corrections when necessary.

According to Patton (2002), "Where all three – analyst, those studied, and reviewers –

agree, one has *consensual validation* of the substantive significance of the findings” (p. 467).

Initially, there was a redundant set of theoretical themes with disaggregated variables under each theme. Ultimately, I aggregated the themes into encompassing themes representing each construct. I initially categorized themes based on the constructs identified in the literature. I anticipated there would be some redundancy and aggregated themes into categories during subsequent phases of the data analysis procedure. This technique is justified by Richards (2005) who states, “Your catalogue of ideas is likely to shrink, as it becomes clearer to you what matters and what is extraneous. You’ll be merging categories that are similar, and deleting irrelevancies” (p. 136). I expected themes to emerge and collapse together. Thomas (2003) points out that three to eight categories is the target for studies using the inductive approach and when researchers report in the realm of ten or more: “This indicates that they have probably not finished the process of combining the smaller categories into more encompassing categories or they have not made the crucial decisions about which categories are the most important” (p. 9).

The flexibility of my chosen methodology proved to be an asset, although it was challenging not to continue to fall into a stepwise process. I began the analysis process by writing themes on sticky notes color coded by construct. I placed the sticky notes in columns under the corresponding construct on a poster. Then, I listed the themes in a table with examples that combined the archival and interview themes. I realized I did not agree with some of the themes I had indicated on the data once I began listing supporting examples. I also realized there were more dimensions for some themes

when revisiting the list and entering in supporting examples. In some cases, I was uncertain which constructs a theme represented or whether something mentioned in the data was a theme. In these cases, I created memos. If the themes fell under multiple constructs, were related to other themes or could be collapsed, I tried to retain as many themes and dimensions as possible with the anticipation of collapsing them later. Next, I returned to the original poster and examined my original analyses to ensure the examples I had placed under each theme made sense. If an example failed to describe a theme adequately, I assessed my conception of the theme and revised it if needed. My final step was collapsing themes as necessary, creating new categories where needed and distinguishing among perspectives, themes and dimensions. According to Richards (2005), "As you take off from the data, expansion seems uncontrollable, but with carefully monitored investigations of the new areas the data demand, you will find the project levels off, fewer new categories are created and require investigation" (p. 135-6). The thematic analysis provided the basis for higher-level data analysis. Writing memos was crucial to assessing themes initially identified and led me to collapse some into a single theme.

Higher-Level Qualitative Data Analysis

Higher-level qualitative data analysis included two components, the first of which was establishment of three distinct phases in 1983-2012. Each phase begins with a key event that catalyzes a series of consequent events in response. The three phases represent distinct resilient outcomes in the SF community over time. The three outcomes culminate in a resilience process. I was able to compare respondents' accounts of what they felt were the key events in the unfolding process with the timeline events I identified from the archival data. The interview data provided me with

information about the importance of events from the perspective of the community. The three phases identified therefore amalgamate the information from the archival data and the interview data. Identifying the three phases in the process over time made it possible to address the research question, “Does resilience evolve and change over time, or is it an outcome measurable at a single point in time?”

I created a model representing the linkages between constructs I identified in the literature as contributing to community resilience. Qualitative models are a critical aspect of theoretical development because they display the linkages between constructs. Understanding these linkages is necessary to move beyond description to using theory to explain complex processes. I built my theoretical model based on the discussion about the role of the constructs in the literature. The literature does not provide models of these linkages, but does suggest interactions between constructs and argues that all of them contribute to resiliency. My model includes an additional concept of internal and external processes, based on the literature and the findings from this study.

Finally, I developed models for each of the three phases of the process over time in the SF community. These models describe the extent to which the constructs contribute to or decrease resilience at different points in time. These models are based on my general model, described above, but highlight the processes and linkages that are most evident in each phase. These models provide understanding of how resiliency changes over time, resulting in different outcomes.

CHAPTER 4 RESULTS

This chapter contains the results of the analysis of the archival data and interview data, including the timeline, the inductive analysis and the identification of different periods or phases in the process in SF community. First, I present a timeline that describes how the technological disaster at the CK Superfund site developed and evolved over time, highlighting the key events in this process. Second, I describe the theoretical themes that emerged from the archival data and the personal interviews. Third, I explain how the factors that contribute to or explain resilience (or lack thereof) change over time as the process unfolded around the CK Superfund site.

Timeline of Events of the Unfolding Technological Disaster at the Cabot-Koppers Superfund Site

Godfrey Cabot established the Cabot Carbon Company in 1945. The wood oils from the former charcoal production facility “were stored in large lagoons to allow them to settle” (Leithauser, 1991a, p. A10). Raymond Tassinari, a developer who bought the property after the Cabot Carbon Company closed in 1967, drained two of these lagoons filled with toxic chemicals from the property into Hogtown Creek. The two dumped lagoons, totaling one million gallons, contaminated the creek for a length of five miles (Leithauser, 1991a). “A county judge ordered Tassinari to pay \$100 and do something with the polluted sludge. But in the late 1960s, environmental standards were different (Leithauser, 1991a, p. A10).” Tassinari responded by spreading the sludge over the site.

The next owner of the property, Harry Hamilton, discovered the poisonous sludge when bulldozing the property. (Leithauser, 1991a). This caused former pollution control engineer for Alachua County Ron Ferland to get in touch with the EPA. Investigators from the EPA came to the site and found several chemicals emitting into the Main St.

ditch and then flowing into Hogtown Creek. This contamination came from over 50 years of industrial activities from both Cabot Carbon and Koppers companies. Koppers was a wood treatment facility using processes involving toxic chemicals and adjacent to the Cabot Carbon facility (Leithauser, 1991a).

The purpose of the Superfund legislation, enacted December 11, 1980, was to identify and cleanup the worst hazardous waste sites in the U.S. in a timely manner. Cleanups took longer and were more expensive than expected and budgets were cut. These unforeseen circumstances led to belated cleanups (Leithauser, 1991a). "Since its inception, the Superfund program has alienated nearly everyone, even those who disagree with each other on everything else: environmentalists, industrialists, federal budget analysts and the unlucky neighbors of toxic waste sites (Leithauser, 1991a, p. A10)." The context of interest to the present study, the Superfund cleanup process, constitutes a slowly unfolding process.

Tables 4-1, 4-2 and 4-3 provide a chronological summary of events reported in the archival documents consulted. I numbered each event as well to make it easier to refer to a specific event in this chapter and the next. Key events, denoted with an asterisk, are those that catalyze a series of consequent events in response. I also provided a reference of the source of information for each event. I divided the events into three phases, based on the similarity of the key events and responses to them in each time period. Phase 1 extends from 1983 to 1990, Phase 2 from 1991 to 1997, and Phase 3 from 1998 to 2013. Key events are not necessarily markers of the beginning of phases. I consider the beginning of Phases 2 and 3 to be responsive events to a key event in their respective previous phases. My criterion for separating these phases at

the points in time described above was the similar characteristics of the events within each period.

Phases of Timeline Events

Phase 1. Phase 1 began with the enactment of the Superfund law in 1980 (event #1). The first key event was the initial CK Superfund site listing in 1983 (event #3). A series of responsive events, largely procedural in nature, followed this key event. The only key event in this phase that was an example of citizen participation was when a former UF student presented aerial photographs of the site at a public meeting. This former UF student brought the photographs to the EPA's attention on multiple subsequent occasions (U.S. Environmental Protection Agency, 2010). The photographs showed evidence that the contamination was more extensive than the EPA knew. This was a watershed event with respect to catalyzing more investigation of the site over time and further citizen participation on the part of others, within and outside the community, as the process unfolded over time.

The responsive events in this phase primarily consisted of standard EPA procedures under the Superfund law, the first of which was conducting a Remedial Investigation (RI) and a Feasibility Study (FS). The RI documents the data collected about the conditions on the site and the nature of the contamination. Additionally, the RI consists of evaluation of potential risk to human health and the environment and performance and costs associated with treatment technologies under consideration (U.S. Environmental Protection Agency, 2011b). "The FS is the mechanism for the development, screening, and detailed evaluation of alternative remedial actions (U.S. Environmental Protection Agency, 2011b, para. 3)." According to the Environmental Protection Agency (EPA), these studies "are conducted concurrently – data collected in

the RI influence the development of remedial alternatives in the FS, which in turn affect the data needs and scope of treatability studies and additional field investigations” (U.S. Environmental Protection Agency, 2011b, para. 4).

The next events responsive to the initial site listing involved the major players in this phase, the EPA and Florida Department of Environmental Regulation (FDER). These agencies entered into a Cooperative Agreement to conduct the RI/FS (event #6) that later expired (event #10). A Cooperative Agreement is “an assistance agreement whereby EPA transfers money, property, services or anything else of value to a state, university, or non-profit...organization for the accomplishment of authorized activities or tasks” (U.S. Environmental Protection Agency, 2012b, para. 10). Following this expiration, the EPA adopted the primary responsibility for remediation of the site (event #10). Then, the EPA, Cabot and Beazer signed a new order to complete the RI/FS (event #11). Beazer is the owner of the property where the Koppers plant operated and is the responsible party for the Koppers portion of the site. Cabot is the responsible party for their portion of the site.

N. Main St. is adjacent to the Cabot side of the site. This close proximity to the site led to delay of the street’s proposed expansion as the RI and FS were underway. There were “liability fears...Nobody wants to get a bill from [the] EPA” (Leithauser, p. A10). The Florida Department of Transportation (DOT) wanted to expand the road to alleviate traffic congestion (Leithauser, p. A10) and proposed contamination removal in order to begin redevelopment (event #7). The next key event, the signing of the Record of Decision (event #20), happened after completion of the RI/FS. The Record of Decision (ROD) includes information from the RI/FS. The ROD, “is a public document

that explains which cleanup alternatives will be used to clean up a Superfund site” (U.S. Environmental Protection Agency, 2011b, para. 1). Following the approval of the FS/RI, EPA issued of the ROD (event #20) and issued an order to Koppers and Beazer requesting a design for the remedies selected in the ROD (event #21), marking the end of Phase 1.

The site listing was a key event that catalyzed a series of responses in Phase 1, predominantly characterized by standard government agency policies and negotiations. The major players in this phase were the government agencies EPA and the Florida Department of Environmental Regulation (FDER), formerly called the Florida Department of Environmental Regulation. The first example of citizen participation emerged in this phase. Although only one particularly noteworthy example of citizen participation occurred in Phase 1, it was paramount in events that followed in later phases with regard to investigative and community activities. In Phase 1, the Superfund process played out from the site listing to the ROD. This set of EPA procedural events repeated over time as new information emerged and regulations changed.

Phase 2. Phase 2 began with Cabot paying Gainesville Regional Utilities (GRU) for the right to pump groundwater into GRU’s sewer system as part of an interim remedial action (event #22). This event was a response to the ROD signing and the confirmation of remedial action plans in Phase 1 (event #19). Then, Cabot agreed to pay for a portion of the cleanup cost and to start cleanup by signing a Consent Decree (CD). However, Koppers initially refused to sign (event #23). A CD is:

A legal document, approved by a judge, that formalizes an agreement reached between EPA and PRPs [Potentially Responsible Parties] through which PRPs will conduct all or part of a cleanup action at a Superfund site, cease or correct actions or processes that are polluting the environment, or

otherwise comply with EPA regulatory enforcement action. The CD describes the actions PRPs will take and is subject to a public comment period. (U.S. Environmental Protection Agency, 2012b, para. 7)

This event led to the next key event (#24) in which the EPA mandated that Koppers perform cleanup actions under a Unilateral Administrative Order (UAO). A UAO is, “a legal document signed by EPA directing the PRPs to take corrective action or refrain from an activity. It describes the violations and actions to be taken, and can be enforced in court” (U.S. Environmental Protection Agency, 2012b, para. 32). This key event was the first instance in the cleanup process EPA exercised its authority noticeably by forcing Koppers’ compliance.

A series of responsive events followed event 24 in which Cabot and Koppers complied with EPA procedures for implementing remedial actions. Cabot received EPA approval (event #28) for its remedial actions. However, the EPA mandated Beazer and Koppers to complete a Supplemental Feasibility Study (SFS) (event #30) and later found the SFS unsatisfactory (event #39). While those events took place, Cabot looked for two old wells believed to threaten the aquifer, but failed to find them (event #27). This investigation was a response to the provision of aerial photographs to the EPA showing evidence of further contamination. Another key event was during Phase 2 when Gary Massey sued nine companies and individuals because of the health problems he suffered from operating a car dealership in close proximity to the site (event #25). This was the first example of litigation that took place. Massey later sued the attorney that represented him in this case and ultimately owed money long after he received his original settlement (event #50).

The next key event (#31) was when Beazer took their first remedial action on the Koppers site. Responses included additional remedial actions on the part of Cabot and

Beazer. Beazer also completed further investigation (event #32). Key event #35 was another example of litigation. Cabot was the plaintiff in a lawsuit against 21 defendants, including the City of Gainesville, because Cabot claimed the city owned a small portion of the site. The city of Gainesville responded by arguing there was no pollution in the part owned by the city. Nonetheless, the city paid Cabot to settle. In order to avoid further litigation, Cabot agreed to pay GRU additional money for Project Jumpstart. This agreement allowed Cabot to pump groundwater into GRU's sewer system as part of the site's remediation (event #37).

The beginning of remedial actions on the Cabot portion of the site, increased investigation of the site, additional government policy and negotiation activities, and the first instances of litigation surrounding the issue all characterized Phase 2. The major players were the EPA, Cabot, Beazer and Koppers. The events in this phase revolved around remedial actions and litigation involving large sums of money. In key event #35, for example, Cabot filed a lawsuit to cover the cost of cleanup. This is the first phase in which money becomes a key motivational factor in the process. This phase also marked the first remedial action by Beazer and Koppers.

Phase 3. Phase 3 began with excavation on the site in response to the aerial photographs provided to the EPA showing evidence of further contamination. At first, no evidence of further contamination was found (event #40), although these activities led to the first key event in Phase 3, the discovery of one well (event #41). Cabot performed additional field work in the area where there was some evidence of additional wells (event #43). Beazer submitted an SFS to the EPA as a response to the UAO issued in Phase 2 (event #24). The EPA reviewed and amended the document (event #42). The

next key event in Phase 3 was the presentation of the proposed cleanup plan and ROD amendment to the public (event #44). Both the Gainesville City Commission and Florida Department of Environmental Protection (FDEP) argued that the proposed remedial action was insufficient.

The subsequent key event in Phase 3 occurred when the contamination in the Floridan aquifer was discovered (event #45). This event catalyzed a series of several investigative (events #47-49) and procedural responses (events #51-53, 57-62). GRU claimed that the contamination could reach the Murphree Wellfield, Gainesville's drinking water supply, within four to five years (event #46). Beazer disagreed with this claim. More testing as a further response revealed that the worst contamination was the deepest in the area below the site, a contradiction to previous assumptions (event #47). Beazer believed these results showed the contamination posed no imminent threat to the wellfield, although GRU felt more testing needed to take place. The procedural responses to the discovery of the aquifer contamination included an additional FS (event #51, 55), with a public comment period following the release of the draft FS (event #52).

The discovery of the contamination in the Floridan aquifer catalyzed community-level responsive events (event #45). For example, seven Gainesville residents sued the RPs for \$500 million (event #54), although the lawsuit was later dropped. The other community response was when Gainesville residents formed a local nonprofit organization called Protect Gainesville Citizens (PGC). The EPA awarded PGC a Technical Assistance (TAG) grant so PGC could hire a Technical Advisor to summarize and disseminate technical documents to the public (event #56).

Phase 3 also included two events responsive to the evolution of the issue over time itself. These responses were not to any one event specifically. The first of these two events was the public disclosure of a contract between GRU and Koppers. GRU was a long-standing purchaser of Koppers' utility poles. Shortly following this, Koppers announced the closing of their Gainesville plant, event #53 (Clark, 2009). Koppers denied a connection between their closing and the disclosure of the contract since the company had been scaling down its Gainesville operation for some time. The second of these events responding to the cumulative process over time and the last key event in this phase was the issuance of another ROD (event #62). As a result, contaminated sediment was removed from Hogtown and Springstead creeks (event #63). Additionally, procedural responses followed including CD negotiations (event #64), filing the CD and the subsequent public comment period.

Phase 3 marks the period when the true nature and extent of the contamination started to become fully apparent. This information heightened attention paid to the issue and led to dramatic increases in government actions, as well as citizen participation, particularly concentrated within the SF neighborhood due to perceived public health risks. Litigation surrounding the issue increased. GRU and community members become key players in the cleanup process in addition to the EPA, Beazer and Koppers. Community members involved in the issue split into factions with strongly held opinions and beliefs about the future of the site and what the exposure to the contamination entailed. Evidence of this is seen in event #54 when seven residents filed a lawsuit against the RPs. Nonetheless, PGC had received grant funds (event #56) to assist in making technical information understandable to community members. Event

#46 is an example of the differing opinions that created uncertainty and resulted in factionalism in the community. GRU and Beazer differed in their estimation of the threat to the Murphree Wellfield, Gainesville's drinking water supply. These differing opinions and perspectives led to additional testing and additions to the original cleanup plan. The additional testing and procedural responses delayed the cleanup process. This delay can be seen in key event #47. Test results revealed new information, the dispute remained because GRU and Beazer interpreted the evidence differently.

The number of key events increased in each phase, indicating the increased importance of the events unfolding over time. Litigation increased from Phase 2 to Phase 3, perhaps due in part to increased citizen participation as information emerged about the contamination and thus, perceived health risks. Involved citizens split into factions due to the complexity of the situation, indicating increased conflict and discord over time. The emergence of new information about the nature and extent of the contamination over time resulted in the need for a new FS, ROD and CD, further drawing out the cleanup process.

Theoretically Based and Emergent Themes from Data Analysis

Themes representing all ten theoretical constructs contributing to resilience emerged during data analysis. The theoretical constructs were: (1) social capital [(a) bonding, (b) bridging, (c) linking], (3) place attachment, (4) sense of community, (5) collective action, (6) collective efficacy/empowerment, (7) social support, (8) vulnerability, (9) risk and (10) trust. I expected themes to emerge that did not fall under any of these constructs and created a miscellaneous category for such themes. Some themes were in the miscellaneous category initially. However, upon further examination, I realized that many of those themes were in fact strongly related to one or more of the

theoretical constructs. I do not discuss the themes that remained in the miscellaneous category because they were mentioned only once or twice in either the archival or interview data. Therefore, they were not seemingly representative of any general perceptions in the community.

Social Capital

I defined social capital as formal and informal network participation based on access to symbolic, economic and cultural resources. In contrast to the findings reported in much of the literature about community resiliency, social capital played an unimportant role in the resilience process in this case. I explored the role of three forms of social capital, bonding, bridging and linking, but only linking capital was significant in the case of Cabot-Koppers.

Linking capital

I defined linking capital as relationships between community-based groups or members of the community and organizations or individuals outside the community with authority and responsibility for decision-making regarding the Superfund site. These figures reinforce ties based on hierarchical relationships.

Relationships between networks of community members and networks of decision-makers. Relationships between networks of community members and networks of decision-makers, such as the city and county commissions, county DOH, FL DEP and the EPA, exhibited linking capital. Citizens, activists and representatives from government agencies felt that these relationships were vital to government representatives having accurate information. For example, community members provided input at community meetings, such as event numbers 9, 18 and 44, where EPA representatives heard their concerns. Several respondents specifically said that

information flowed from community members to officials and indicated that community members educated government representatives about local issues surrounding the superfund site. For example, one representative from the county DOH said the agency releases a draft health assessment and incorporates community feedback before submitting the final assessment (Anonymous, personal communication, August 30, 2012a).

Relationships between local government agencies, the EPA and community members. Another expression of linking capital was the linked relationship between local government agencies, the EPA and community members. Recommendations from local government agencies to the EPA regarding the various studies and cleanup plans developed throughout this process. Then, a community member raised concerns to local government about an important oversight in the EPA's proposed cleanup plan. Local government agencies agreed with this concern and brought it to the attention of the EPA. The EPA decided, as a result, on completing further investigation. This linked set of relationships appeared throughout the process. Another example was PGC's role in this process. PGC received a grant from the EPA to analyze EPA documents like the ROD and cleanup plan and provided the EPA with comments and recommendations. PGC prepared summaries of the documents and provided information about how to move the process forward in the community to citizens.

Bonding capital

In this study, bonding and bridging capital were not as significant as linking capital. I defined bonding capital as close personal ties based on trust from shared interests and norms of reciprocity within groups that reinforce those ties.

Discord – factionalism. A long-term resident of the SF neighborhood described an instance of successful citizen mobilization. Residents collectively fought against the proposed expansion of a public works facility compound in close proximity to the neighborhood. This victory empowered neighborhood residents to tackle the Cabot-Koppers issue. However, continued involvement in this issue often created discord among community members. Shared interests do not always create bonding capital, as shown in the example of factionalism in the SF neighborhood.

Bridging capital

I defined bridging capital as relationships among networks that create ties to other informal and formal networks. As a result, members of networks gain access to resources available to outside networks.

Involvement of people and groups outside the SF community in the CK issue. The clearest expression of bridging capital was the involvement of people and groups outside the SF neighborhood in the controversy surrounding the Superfund site. For example, groups in the larger Gainesville community, but peripheral to the immediate SF neighborhood, became involved in the issues. A former UF student used the map library as an institutional resource and looked up aerial photographs of the site at different points in time. He “discovered what he believed was a lost lagoon - one of the ponds where the old Cabot Carbon plant stored toxic waste” (Leithauser, 1991a, p. A10). He shared this information at a public meeting where EPA administrators claimed they would investigate the matter further. He saw no evidence of follow-up and continually reminded the agency of the issue. The only respondents that spoke about the kind of involvement that reflects bridging capital were activists involved in the issue in the mid-80s to early 90s. The archival data also indicated that this kind of broader

involvement from the larger Gainesville community and by groups outside the SF neighborhood occurred mostly in this period. It appears that the importance of bridging capital declined over time.

In summary, linking capital was the only form of social capital that seemingly played a consistent and significant role in community processes and responses to the identification of the Cabot-Koppers Superfund site. Some respondents gave examples of bonding capital, but only those who were residents in the immediate SF neighborhood, either now or in the past. Bridging capital played a role in community mobilization during Phase 1, although only activists provided examples.

Place Attachment

Place attachment refers to the emotional attachment to the physical place in which you live. I anticipated the archival data would provide me with little information about the role of place attachment because of the emotional component in the construct. It seemed unlikely that archival documents, such as municipal documents, would be useful. This is why I asked a question specifically designed to elicit responses relevant to this construct in my interview instrument: "How do you feel about where you live currently considering the Cabot-Koppers Superfund site?" Although I followed this question with further probing, little evidence of place attachment emerged from this question. I anticipated much more evidence of the importance of place attachment, although the lack of responses is revealing in itself. Respondents discussed emotions at length, just not in the context of feelings about their residence.

Negative and positive emotions. The respondents who reported feeling strong emotions regarding place attachment also reported deep involvement in the issue. Even some respondents who did not report feeling emotions commented on the important

role of emotions in playing out events. Anger, fear, frustration and stress were the most commonly reported emotions. Respondents overwhelmingly linked the motivation to participate to emotions. Health concerns, particularly regarding uncertainty about the risks associated with exposure to contamination, caused community members to experience negative emotions. Differences in opinion with regard to the information available about the contamination resulted in conflict and factionalism in the community, and mistrust in government. A couple of respondents did report positive emotions engendered by the motivation of individuals involved in the issue and the community engagement, but most felt the opposite.

Spatial proximity. Individuals' perceptions of the site's impact on their feelings about where they live had a direct relationship with their spatial proximity to the site. One current SF neighborhood resident's sentiments about where they live changed over time. S/he was initially mortified about the Superfund status. However, this person said that s/he eventually calmed down and came to appreciate the neighborhood again after listening to scientific opinion, learning more about the issues and filtering through some of the hysterics.

Stench. A common local concern expressed in both the interview and archival data was the stench that originated from activities on the site when the Koppers facility was operational. A couple of respondents commented on odor complaints filed against Koppers. One respondent reported that Koppers ceased using creosote in their operation due to residents' complaints about the smell. Respondents also reported smelling the site from afar, one from their residence at the time in the Duckpond neighborhood two or three miles away. A quote from the *Iguana* stated, "local residents

who have to breathe Kopper's pollution daily" (1990, p. 16). This quote illustrates the severity of the concern for those who lived in immediate proximity to the site when the Koppers plant was still operational.

Sense of Community

Attachment to the social issues in the community in which you live was how I defined sense of community. Three themes emerged, concern over local issues, conflict, and not an isolated issue. Four types of concerns over local issues were identified. These were health issues, property values, delay and the future of the site. When asked what the major concerns were in the community with respect to the Cabot-Koppers site, all respondents named concern for health issues and property values. There was widespread agreement that these two local concerns affected sense of community regardless of the level of involvement in the Superfund issues or position on those issues. Sense of community was very significant in this study, particularly with respect to local concerns for health issues and property values.

Concern over health issues. Concern over health issues was pervasive in both the interview and archival data. Fear of illness reduced the well-being of community residents. Along with health as a major concern, respondents frequently commented on the contamination issues underlying this concern, in particular the contamination concerns that surfaced within the past seven or eight years. These concerns were the threat to the drinking water supply and wind-blown dust reaching adjacent properties. Perceptions of the severity of health concerns varied from critical to not immediately life threatening. An example of little concern came from a county DOH representative in their discussion of contamination in the soil from wind-blown dust on properties adjacent to the site as being, "not at a concentration that presents a significant health risk"

(Anonymous, personal communication, August 30, 2012a). On the other hand, an example of the crisis perspective was, “the potentially deadly harm to public health and safety that now daily torments so many of us here in surrounding neighborhoods” (Parsons, 2009, para. 8). Most respondents’ perceptions fell somewhere between those two extremes. The amount of dioxin exposure that an individual can withstand is uncertain and likely affects different people in different ways. Exposure to dioxin does increase cancer risk, but all interview respondents that were asked agreed about the uncertainty – that too many confounding factors exist to establish a causal relationship between an individual in the neighborhood’s health and contamination from the site.

Concern over property values. Concern over property values appeared in both the interview and archival data. The link between litigation and property value concerns was strong since lawsuits occurred when people sought damages for loss of property value and new realty disclosure laws passed as a result. Some people in the neighborhood sought a buy-out of their properties. Six interview respondents commented on the impact of the SF neighborhood’s reputation with respect to property values. The stigma of the Superfund site to the adjacent neighborhood was particularly powerful with respect to property values in the SF neighborhood since it caused the neighborhood to gain a reputation of being toxic. This has made the neighborhood unattractive to potential newcomers and created a barrier for current residents to sell their property. One respondent felt that ethical reasons might have kept some people from selling, in addition to low market value. Others said that people living near the site might have been too afraid and too poor to test the soil on their property for dioxin even if they were legitimately concerned about their health.

A respondent living in the SF neighborhood spoke about the actual value of properties as equivalent to their perceived value:

A property is only worth what someone is willing to pay for it. And of course, those properties that abut Koppers and have signs on them that say 'you shouldn't walk outside without your shoes on' have been seriously affected. (Anonymous, personal communication, September 13, 2012)

Another interview respondent also commented on this deliberate lowering of property values by local citizens, specifically the very vocal minority faction in the SF neighborhood, through spreading exaggerated threats of dying and illness in order to file successful damage claims (Anonymous, personal communication, August 29, 2012a). Other respondents commented that residents whose main capital asset is their property may be particularly insistent on blaming Koppers. Nonetheless, other confounding factors have also lowered property values, primarily the failure of the housing market in 2009.

Concern over delay. Concern in the community expressed over the delay associated with the Superfund process was very evident in the archival and interview data. Concern over delay contributed negatively to sense of community and resulted in decreased trust in institutions and the bureaucratic process. The cleanup process itself is drawn out by nature, heightening the feelings of anxiety and immediacy of danger expressed by community members. "We don't want these delays...We want to move forward with an appropriate clean-up (Smith, 2010e, para. 16)." This delay is perceived as tactical, deliberate or both. Another respondent provided an example of the deliberate delay in the process by pointing to the joke that the Superfund law is referred to as the, "environmental lawyers relief act" (Anonymous, personal communication, August 29, 2012b). Different respondents perceived the source of the delay (tactical,

deliberate or both) differently. Respondents attributed the responsibility for delay to community members, Beazer, government agencies, litigation, community participation, the Superfund process itself and the prolonged studies involved.

Concern over the future of the site. Both the archival and interview data had expressions of concern about the future of the site with regard to redevelopment alternatives. The nature of the contamination precludes unrestricted use of the property, therefore, appropriate and viable options include commercial and residential (apartments, not houses) development. An interview respondent identified two distinct conflicting groups within the SF neighborhood, saying that the shorter-term residents seek to landscape the area, a “quick fix” (Anonymous, personal communication, August 23, 2012) alternative to cleanup. Since the site is so close to a residential neighborhood, avoiding a brownfield scenario is ideal, a sentiment shared by a few respondents. Brownfields refer to abandoned industrial sites. Some respondents wanted redevelopment that would attract new residents to the community. One respondent felt it was very important to have citizen input with respect to cleanup strategies and future land use decisions.

Conflict. Conflict resulted primarily from the uncertainty surrounding the issue. Discord and the resulting factionalism among residents involved in the issue represented conflict in the community. Uncertainty pervaded this issue in many ways. Who was responsible for the problem and fixing it? What can be done about the issue? What is the extent of the pollution? How much economic loss would there be ultimately? When would the remediation be completed? How would anyone be able to ascertain effects of the pollution from the site could from contamination unrelated to the site?

What information should and could be believed? How much cleanup should be done?

This uncertainty created divisions in the community that led to conflict. The escalation of conflict in the community resulted in placing blame, threats and lawsuits, furthering the discord. Sincerity of motivations became suspect. Community members perceived the primary motivations for some actions by stakeholders were money or special interests, which could include money. An example of this perception was community members believing the EPA's cleanup plan design was sensitive to the interests of the responsible party over the community's.

Not an isolated issue. The persistence of this issue, particularly that the Cabot-Koppers site is not an isolated issue, was a clear theme. There are two aspects to this sense that the issue is not isolated, one being that there are repercussions outside of the immediate neighborhood in the larger Gainesville community and the other being that Superfund sites are common nationwide. Both ideas were prevalent in the archival and interview data. One respondent recognized the issue as a global one where industries are getting away with contaminating communities all over the world. This may indicate a poor sense of community. Other comments about local pollution issues in the community in the archival and interview data are examples of how the site is not an isolated issue. Respondents pointed to the Fairbanks contamination and Farchan Laboratories (see event number 38) as examples of issues that received immediate mitigation. The threat to public health was more imminent in both of the previous examples. This threat was likely why these instances were dealt with in a much more timely fashion than CK.

The archival and interview data mentioned the magnitude of the Superfund sites nationwide regularly. Among the numerous Superfund sites across the country, “Many other Koppers polluted towns range nationwide” (Parsons, 2009, para. 12). Another respondent spoke to the nature of the monitoring taking place on the site. Other industrial sites that used processes similar to CK implemented monitoring of the site because the potential for contamination is so high. Comparing CK to other contaminated sites emerged in the data due to the commonality of Superfund sites across the county. “She [former mayor of Gainesville] said she toured a more contaminated site in Atlanta that was ready in a couple of years” (Clark, 2009, para. 19). One interview respondent expressed unhappiness regarding the government agencies involved with the cleanup because they thought these agencies were not addressing the issue rigorously enough. Agencies were getting away with too much, more than they get away with on other sites. The issue being persistent beyond the SF neighborhood is another emergence in the archival and interview data. “Toxic waste not cleaned up for over 35 years in Gainesville is placing far more residents at risk than those who live near the site” (Hallman, 2010, para. 1).

Collective Action

The definition of collective action was participation by community members in formal and informal organizations. Collective action can result in consensus (e.g., formation of grassroots organizations) or discord (e.g., conflict, mistrust that creates barriers to action) in the community. Collective action played a moderate role in this case. Other authors have found that collective action is a very important component of resilience. Therefore, I anticipated I would find a number of themes representing collective action, but I only found two themes that emerged, communication and calls to

action. Even when respondents told me about collective actions, most were not particularly powerful activities. Many were relatively passive, such as grant writing or making and distributing informational brochures. These examples in the Cabot-Koppers case contrast strongly with the militant group actions reported in the literature. A majority of the actions in this case were reactive, not proactive, responses to events. Examples included demonstrations and input by community members following document releases by the EPA as in event numbers 18, 44, 57 and 60.

Communication. The only collective action that has been consistent throughout the cleanup process was communication, meaning formal or informal correspondences between stakeholders. Even though various forms of communication were not just centered on milestone events, it increased surrounding such events. Examples of communication included comments made at community meetings, e-mails, letter writing, published media (eg. editorials by community members), phone calls and website posts. Residents and representatives from local government agencies used communication in attempts to catalyze action from government officials, warn local residents about public health issues, or provide information to community members or government officials about the site.

Calls to action. Placing pressure on stakeholders was the primary call to action. Stakeholders, such as community members and government officials, tried to catalyze other stakeholders to take action by placing pressure on them. This took place through institutional and citizen channels. An example of institutional, or official, channels was community members placing pressure on local government agencies to comment to the

EPA. An example of citizen, or grassroots, channels were calls made by residents to let people know in the neighborhood about a public meeting.

Collective Efficacy/Empowerment

The definition of collective efficacy/empowerment was the belief that citizen participation is a worthwhile effort that will produce perceived control over the institutions that affect one's community. Similar to collective action, collective efficacy/empowerment is treated as a foundational construct contributing to resilience in the literature. I likewise expected to find many themes that fell under the construct collective efficacy/empowerment, but only two emerged. These were value of citizen participation and taking matters into their own hands. Doubt in efficacy of collective action has the potential for destructive effects in the community. For example, the perceived value of involvement in the issue had to do with whether or not citizen participation made a difference and yielded results.

Value of citizen participation. The value of citizen participation emerged as either having value or not. When asked about the perceived value of citizen participation, nearly all the respondents felt that citizen participation was valuable, regardless of their involvement or occupation. The perception that citizen participation lacked value resulted from a lack of cohesion in the community. This perception caused disillusionment. This disillusionment appeared as exhaustion and burn out from involvement in the issue. This exhaustion and burn out led to disempowerment and contributed to a lack of resilience in the SF community. A local scientist commented about how they perceived citizen participation had no impact beyond helping people blow off steam (Anonymous, personal communication, August 30, 2012c). A local

government representative felt citizen participation either fosters trust or mistrust in the government (Anonymous, personal communication, August 30, 2012a).

There was variance with regard to how much value citizen participation had and also, the extent to which citizen participation made an impact. Some respondents felt that citizen participation was not strictly valuable or invaluable. A representative from the EPA pointed out that a tradeoff exists with regard to the value of citizen participation to the agency (Anonymous, personal communication, August 24, 2012). While citizen participation enhances the decision making process, collaboration is time consuming. Nonetheless, the outcome ultimately is higher quality compared to no collaboration. Another respondent echoed the delay caused by citizen participation (Anonymous, personal communication, August 28, 2012). A respondent that was an activist in the 80s and 90s commented that despite the importance of public involvement, the government could do whatever it wants (Anonymous, personal communication, August 25, 2012). This respondent also acknowledged that citizen participation made a difference, such as prompting official actions, although they were uncertain as to the extent (Anonymous, personal communication, August 29, 2012a). An activist heavily involved in the more recent years of the cleanup process commented that while citizen participation is valuable, it is devalued by people perpetuating falsehoods and over exaggerating the risk to human health, thus wasting the time and energy of others involved in the issue. A couple respondents felt being vocal helped the issue get media exposure.

Taking matters into own hands. In this case, people and groups taking matters into their own hands emerged in the interview and archival data. Examples of all levels of stakeholders, such as citizens, organizations, government representatives and

agencies, taking matters into their own hands were prevalent in the data. The most salient dimension of people and groups taking matters into their own hands was attempting to speed up the cleanup process. A representative from GRU commented that most groups, including LIT and PGC, adopted the attitude that the EPA's proposed plan for cleanup was sufficient to move ahead with instead of fighting with the EPA more and waiting for the perfect plan (Anonymous, personal communication, September 12, 2012). Citizen participation inadvertently slowed down the cleanup process. Several respondents also spoke to the nature of the Superfund process itself as being drawn out. Additionally, some respondents claimed there was deliberate slowing of the process going on in this case (see the discussion under "sense of community").

People and groups educating themselves and others in the community was another example of people attempting to take matters into their own hands. "At Protect Gainesville Citizens and the Superfund Art Project, we are working hard to educate people about the dangers that the site poses to our community" (O'Connor, 2010, para. 4). People having a voice was the last example of people and groups taking matters into their own hands. One resident of the SF neighborhood spoke to people finding their voice and becoming more active in the issue as a result (Anonymous, personal communication, September 13, 2012). Also, the opportunity for voices to be heard was expressed, "Gainesville expects more from the nation's chief environmental watchdog, and today's face time is a good opportunity to register those expectations loud and clear" ("Editorial: Hello to," 2010, para. 4). On the other hand, the data expressed the sentiment that voices were unheard or ignored, "Many have died, many are sick, and nobody is paying attention...Nobody is listening" (Smith, 2010c, para. 8).

Social Support

The definition of social support was community-level protective social ties that act as a buffer against adverse outcomes resulting from hardships that vary by source (eg. family, friends) and type of support (perceived, received; emotional, informational, tangible). The literature treats social support as a primary construct, particularly in the Superfund context. As such, I expected to find several themes that fell under this construct. There was only one, local expertise. This theme was specific to the Cabot-Koppers context because of the local experts in the community specializing in science specific to Gainesville, particularly environmental sciences such as engineering, geology and hydrology. Social support played a minimal and context-specific role in the resilience process in this case.

Local expertise. Flow of information involved those receiving the information and those providing information. Those receiving the information included stakeholders, such as local citizens and government officials. Those providing information were outside and local experts who made themselves available and those who were not experts but had their eye out in the community, such as local media and neighborhood residents. These providers of information were willing and able to lend support to the Cabot-Koppers issue in a meaningful way. The expert and other perspectives tended to be situated by the provider's professional or personal interests and agenda.

The information included background and general information, including but not limited to historical events regarding former industrial activities on the site, the likely and potential impact of the contamination, the spatial proximity of the site to other Gainesville landmarks and the time and location of future public meetings. The information increased in volume as more tests were done on the site and in the SF

neighborhood. The information also increased in availability in more venues as technology advanced over time.

Expert perspective was always important to this case from the onset, but seemed to increase in importance as new information about the nature of the contamination came to light. A local government representative speculated that involvement of scientists probably helped to get the site listed in the first place since they truly understood chemical names, what they meant and dynamics of underground water flows (Anonymous, personal communication, August 30, 2012b). A representative from one of the responsible parties pointed to a public meeting in 2003 where the EPA presented a proposed plan for cleanup (Anonymous, personal communication, September 27, 2012). This respondent identified this meeting as setting off the initial phase of the more recent public reaction to this case. The more recent public reaction began with local scientists who challenged the site conceptual model the remedy being proposed was based on. A representative from GRU commented on the necessity of expertise outside the community to better understand the nature of the contamination that originated from the past activities on the Koppers site, specifically, wood treating creosote (Anonymous, personal communication, September 12, 2012). This respondent explained this type of contamination is very difficult to deal with because creosote is heavier than water and tends to sink, moves very slowly, doesn't easily degrade naturally and is a particular problem for groundwater.

Vulnerability

The definition of vulnerability was a condition of a given community that exists prior to a traumatic event that can impede the adaptive capacity of that community after experiencing a traumatic event. The traumatic event in this case was the Superfund

designation of the Cabot-Koppers site. Vulnerability and resilience are interrelated in the literature and as such, I expected several themes to emerge that fell under the construct vulnerability. There were only two, historical events before the SF community was developed and the inadequacy of science to predict the eventual consequences of Cabot-Koppers.

Historical events before the SF community was developed. Historical events before the SF community was developed describes industrial events that caused pollution since the companies were present before the community was built. This includes the daily activities that took place on the site when the companies were still operating and watershed events that caused additional contamination. For example, once Raymond Tassinari bought the property in 1967, he disposed of poisonous sludge in Hogtown Creek (Leithauser, p. A10). This resulted in the death of wildlife that once thrived in the creek and never fully recovered. These historical events caused conditions that hindered the adaptive capacity of the SF community.

The inadequacy of science to predict the eventual consequences of Cabot-Koppers. The inadequacy of science to predict the eventual consequences of Cabot-Koppers describes how people did not have the scientific knowledge to understand the consequences of the contamination from Cabot-Koppers until it was too late. The regulations that changed over time reflects this theme. For example, *FACT* reported that Koppers had been using an 85 year old well cased to the aquifer with a pipe that they did not have a permit for since permit laws were written long after the well was in operation (Edwards, 1991, p. 11). In the late 60s, A county judge fined Tassinari \$100 and ordered him to, “do something with the polluted sludge” (Leithauser, p. A10) and he

dumped the sludge on the property. The appropriate laws did not exist yet to prevent this environmentally compromising action because the suitable scientific knowledge had not been discovered yet. This created the conditions prior to the Superfund designation that aided in averting the adaptive capacity of the SF neighborhood.

Risk

The definition of risk was the possibility of a community's exposure (economic, symbolic, cultural) to danger, harm or loss. In this case, the exposure of the SF community was the focus. I anticipated risk would be a significant player in the resilience process in this case. There were two themes, the magnitude of risk increased over time and powerlessness.

Magnitude of risk increased over time. The magnitude of risk increased over time refers to the extent of the risk worsened throughout the process. This is so because as science and technology developed, the true nature and extent of the contamination came to light as testing procedures became more robust, for example. Previous assumptions held by stakeholders were debunked, such as the contamination being concentrated on the site itself while the contamination had, in fact, spread to properties adjacent to the site. "Toxins in the soil contaminate additional surrounding properties over time; therefore, toxic neighborhoods grow in size (Hallman, 2010, para. 2)." As a result, continued investigation was called for over and over in an effort to delineate the location of the contamination. This continual investigation created a sense of imminence among some members of the community, while other stakeholders felt the threat posed by the contamination was not imminent. An SF neighborhood resident felt there was a concerted effort to downplay the risks (Anonymous, personal communication, September 11, 2012a). One respondent argued the risk has gone down

since the processes used by Koppers changed and the subsequent closing of the plant (Anonymous, personal communication, August 31, 2012a). Thus, they felt the outrage expressed by SF community members is out of proportion with when the risks were the highest. Additionally, they pointed out the discussion and the lawsuits surrounding the issue heighten the perceived risk in the SF neighborhood.

Powerlessness. Powerlessness refers to the inability of the SF community to mitigate the risk posed by the site. Even once there was more recognition in the SF community about the contamination, there still remains the fact that there was nothing residents could do about it. The community members depend on agencies and lawyers that they are far outside the influence of. Residents lack the ability to control the situation that affects them most directly since they are living in the closest proximity to the site. The idea that residents have been “stuck” in the community was the most prevalent manifestation of powerlessness in the data. Residents were unable to sell their house due to the reputation of the neighborhood and the property value decline:

How would you like to live in a house, knowing no one would buy it because there is no interest in living next to Superfund toxic site? No one can afford to leave, even though an owner or a family member may be sick. (Hallman, 2010, para. 2)

As powerlessness increased in perception by community residents, so did the perceived risk.

Trust

The definition of trust was belief in the reliability of institutions and the bureaucratic process external to the community based on the perceived legitimacy of those institutions and bureaucratic process. Legitimacy in this case means institutions doing what they are supposed to do and how they treat citizens. I anticipated trust

would be a play a significant role in the resilience process for this case. There were six themes that fell under trust, delay, inadequacy/ineffectiveness, skepticism, careful moves and accountability/transparency/responsibility.

Tactical and deliberate delay. Delay reflects growing distrust in the bureaucratic process, specifically with regard to the Superfund cleanup process. There were perceptions of tactical and deliberate delay expressed in the data. The delay in placing blame caused roadblocks that further delayed cleanup as negotiations over who was responsible for paying continued (Leithauser, 1991a). The persistence and continual re-emergence of the issue contributed to its drawn out nature as cleanup plan after cleanup plan were released, for example. Also, delay continually increased as more investigation was requested of the EPA regarding the contamination sources. Delay with regard to community improvement and redevelopment in the SF community caused no new jobs being created by new businesses (Leithauser, 1991a).

Inadequacy/ineffectiveness of government agencies and the bureaucratic process. The inadequacy and ineffectiveness of government agencies and the bureaucratic process resulted in distrust by community members due to the resulting inaction. Community members felt, “the governments involved are simply acting too slowly,” (Greenberg, 1990) despite the institutional efforts. This incompetence on the part of institutions caused the perception of enabled that pollution:

Stearns was one of those in Congress that killed the fund, requiring the polluters, to clean up Superfund Sites back in 1995. The fund was not taxpayer money, so Congress in its wisdom to protect the polluters, killed the bill. (Hallman, 2010, para. 4)

The constant shifting of responsibility, such as the EPA regional managers changing every few years and the site being bought out over and over, contributed to the delay

and perceived tactical ineffectiveness of institutions. A representative from the EPA commented on the learning curve they experienced as a result of their new responsibilities associated with their site assignments (Anonymous, personal communication, August 24, 2012). Besides the tactical delay, community members felt there was a deliberate nature to institutional ineffectiveness, “It’s almost as though they want us to not have any input, but they want it to look good to their higher-ups” (Smith, 2010b, para. 18).

Skepticism. Skepticism resulted from the perceived institutional inadequacy, including institutional absence, falling short and failure to carry out responsibility. The *Gainesville Sun* reported, “residents are both anxious to see that day come and leery that it will be anytime soon” (Smith, 2010a, para. 21), referring to the cleanup. This skepticism further caused a sense that there was a conspiracy at work among the various agencies involved in the issue. An example of this emerged when it became public knowledge that GRU was a long-time customer of Koppers (Curry, 2009). GRU subsequently terminated their contract with Koppers and this contributed to the ultimate closing of the plant, listed as event number 53. Community residents also felt that the EPA’s cleanup plan favored Beazer’s interests over the community’s (Smith, 2010e).

Careful moves. Careful moves refers to particular actions or inactions that were deliberate on the part of institutions to serve their interests and agendas. An example of a careful move was when the responsible party allowed community members to tour the site and ask questions of a representative. According to the responsible party, this opportunity for access was risky, “Because of a \$500 million lawsuit against his company, he said he was going out on a limb to let the public in” (Smith, 2010f, para. 6).

Allowing the public access to institutional representatives and the site itself was a careful move with the objective of increasing trust. Careful moves also included specific actions or inactions with the intent of verification of information, “he had started going over the plan but didn't want to comment until he finished his review” (Smith, 2010b, para. 14). Preserving trust through careful moves on the part of institutions was prevalent in the data, particularly as new information became available.

Accountability/transparency/responsibility.

Accountability/transparency/responsibility refers to the institutional accountability, transparency and responsibility perceived by residents of the community. “The EPA's first responsibility is to protect human health and the environment, and its first objective for the Koppers site is to develop a cost-effective remedial plan to address those concerns (Pearce, 2010, para. 3).” The extent to which community members perceived institutions fulfilling their responsibilities directly affected the extent to which community members trusted institutions. When community members believed institutions had wronged them, they called for institutional accountability and transparency for improper actions. “This criminal activity by corporations requires stiff punishment (Hallman, 2010, para. 5).” This call for institutional accountability and transparency was also true when community members perceived a lack of action. “They need to be honest with us...They need to take the time to tell us what is actually going on (Curry & Smith, 2010, para. 17).”

The key themes I identified as being the ones that appear very critical to understanding the development, or lack thereof, of resilience in the community were: linked relationships, emotions, concern over health and property values, conflict or

discord, value of citizen participation, people taking matters into their own hands, local expertise, historical events, inadequacy of science, government and bureaucratic agencies, the magnitude of risk increasing over time, powerlessness and delay. Social capital was not ultimately an important contributor to resilience relative to the other constructs. The most prevalent dimension of social capital was linking capital. The linking capital themes that emerged in the data were relationships between networks of community members and decision-makers and relationships between local government agencies, the EPA and community members. Negative emotions expressed by community members were closely linked to involvement in the issue. Health and property value concerns were overwhelmingly the predominant concerns in the community. These concerns were emotional for community members more often than not. Uncertainty was the primary catalyst for conflict in the community. Discord in the community resulted in factionalism. Most interview respondents felt citizen participation was valuable despite discord in the community, although there was more variance among the perceived impact respondents felt citizen participation had. People and groups taking matters into their own hands through attempting to speed up the cleanup process and educate community members, inadvertently delayed the cleanup process further.

Local expertise was the only social support theme, although significant with respect to contextual specificity. Local experts in the community specialized in environmental sciences and this expertise was instrumental in the way the information flowed over time. The inadequacy of science and government and bureaucratic agencies were important themes in this case. Environmental regulations increased over

time along with scientific advances, although science was not sophisticated enough to prevent the eventual consequences of Cabot-Koppers. Institutional distrust in the community resulted from the perception that government and bureaucratic agencies were both tactically and deliberately inadequate.

Historical events that took place prior to the development of the SF community were paramount in influencing the site listing and all the events that took place following the listing. These events were particularly influential with regard to the emerging information over time about the nature and extent of the contamination. The magnitude of risk increased over time along with as new information emerged about the nature and extent of the contamination. The request for more investigation resulted in emergent new information, resulting in a sense of imminence among some community members. Ultimately, these community members were powerless to mitigate the risk posed by the site.

Table 4-1. Timeline of events associated with the Cabot-Koppers Superfund site in Gainesville, FL, Phase 1, 1980-1991

Event Number	Time Period/Date	Event
1	12/11/1980	Enactment of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), generally called the Superfund law. This objectives of this law are to clean up hazardous waste sites and identify parties responsible (RPs) for the contamination to hold them financially responsible for cleanup (U.S. Environmental Protection Agency, 2011a).
2	July 1983	The Florida Department of Environmental Regulation (FDER) filed a complaint for violation of their regulations and Florida Statutes against Cabot, for pollution from past industrial activities, and Tassinari, for dumping chemical waste left behind by Cabot in Hogtown Creek (U.S. Environmental Protection Agency, 2011b).
3*	9/8/1983	The initial listing date of the Cabot-Koppers (CK) Superfund site in Gainesville, FL on the National Priorities List (NPL). The NPL is a list of contaminated sites in the U.S. recognized by the Environmental Protection Agency (EPA) as requiring cleanup due to the health and environmental risks posed by such sites (U.S. Environmental Protection Agency, 2012d).
4	June 1984	A judge ruled in Tassinari's favor and offered Tassinari cost recovery (U.S. Environmental Protection Agency, 2011b).
5	9/21/1984	The final NPL listing date for the CK Superfund site (U.S. Environmental Protection Agency, 2012a).
6	December 1984	FDER and EPA agreed to conduct the concurrent Remedial Investigation/Feasibility Study through a Superfund Cooperative Agreement, an assistance agreement between the EPA and other agencies to complete cleanup activities. The purpose of the RI/FS is to determine the nature and extent of a site's contamination and assess the feasibility of possible cleanup actions. The potentially responsible parties (PRPs) are responsible for conducting the RI/FS (U.S. Environmental Protection Agency, 2011b).

Table 4-1. Continued.

Event Number	Time Period/Date	Event
7	1985	The Florida Department of Transportation (DOT) proposed the removal of 4,800 cubic yards of contaminated muck to complete the widening of a portion of N Main St. (U.S. Environmental Protection Agency, 2011b).
8	March 1986	FDER proposed options for the disposal of the muck that stalled the N. Main St. expansion (U.S. Environmental Protection Agency, 2011b).
9	April 1987	FDER held an informational meeting in Gainesville to field questions about the draft RI/FS (U.S. Environmental Protection Agency, 2011b).
10	June 1987	The FDER and EPA Superfund Cooperative Agreement expired. This expiration resulted in EPA assuming control of the CK site's remedial action (U.S. Environmental Protection Agency, 2011b).
11	1988	The EPA, Cabot and Beazer signed an order to complete the RI/FS. Cabot and Beazer are the responsible parties for the CK site contamination. The companies are responsible for funding the remedial action on their respective portions of the site (U.S. Environmental Protection Agency, 2001a).
12	1989	The FDER conducted a health assessment (U.S. Environmental Protection Agency, 2011b).
13	11/27/1989	Robert Douglas (VP Chamber of Commerce) led a meeting about the CK site that civic organizations and residents in the community were not aware of. City and county commissioners and representatives from the EPA, North FL Regional Planning Council, FL DOT and Chamber of Commerce were present (Hawkins, 1990).
14	Nov 1989	Additions to the final RI are completed (U.S. Environmental Protection Agency, 2011b).
15	12/23/1989	Koppers applied for an air pollution permit from the Department of Environmental Regulation (DER) (Karl, 1990).

Table 4-1. Continued.

Event Number	Time Period/Date	Event
16	Feb 1990	RI concluded the contamination posed no health risk and is approved (U.S. Environmental Protection Agency, 2011b).
17	May 1990	FS is approved (U.S. Environmental Protection Agency, 2001a).
18	8/14/1990	Public meeting was held by the EPA to field questions about the Record of Decision (ROD). The ROD explains the cleanup method chosen for the site (U.S. Environmental Protection Agency, 2001a).
19*	August 1990	EPA signed the Record of Decision (ROD), confirming plans for remedial action (U.S. Environmental Protection Agency, 2011b).
20	Sept 1990	ROD is issued, legally mandating RPs to clean site (U.S. Environmental Protection Agency, 2001a).
21	1991	The EPA issued an order to Koppers and Beazer to develop a design for the remedial action decided upon in the ROD (U.S. Environmental Protection Agency, 2001a).

Key events are indicated with an asterisk.

Table 4-2. Timeline of events associated with the Cabot-Koppers Superfund site in Gainesville, FL, Phase 2, 1991-1997

Event Number	Time Period/Date	Event
22	1991	Cabot paid GRU \$247,444 to hook into Cabot's Project Jumpstart groundwater treatment system as part of remedial action on the site (Magrin, 1996).
23	1991	Cabot signed a Consent Decree (CD). A CD is an agreement that the RP will clean the site and pay for their portion of the cost. Koppers refused to sign the CD (U.S. Environmental Protection Agency, 2001a).
24*	March 1991	The EPA issued Koppers a Unilateral Administrative Order (UAO), legally obligating them to clean their portion of the site (U.S. Environmental Protection Agency, 2001a).
25*	7/18/91	Gary Massey filed a lawsuit for more than \$10,000 against nine companies and individuals he claimed responsible for his health issues related to exposure from the Cabot-Koppers site (Leithauser, 1991b).
26	1992	Cabot signed an EPA order to develop the remediation design and execute cleanup activities (U.S. Environmental Protection Agency, 2001a).
27	1992	Cabot looked for two old wells that potentially could contaminate the water supply and found nothing (Magrin, 1998).
28	Dec 1993	Cabot Groundwater Remedial Design was approved (U.S. Environmental Protection Agency, 2011b).
29	1994	Contaminated sediment was dug up from the Northeast Lagoon, located on the Cabot portion of the site (U.S. Environmental Protection Agency, 2001b).
30	1994	EPA issued an amendment to their order to Beazer and Koppers for additional investigation. This amendment included a Supplemental Feasibility Study (SFS)" (U.S. Environmental Protection Agency, 2001a).
31	1995	Beazer installed a groundwater treatment system (U.S. Environmental Protection Agency, 2001a).

Table 4-2. Continued.

Event Number	Time Period/Date	Event
32	1995	Cabot completed the ROD remedy. Beazer completed sampling in Springstead Creek (U.S. Environmental Protection Agency, 2001a).
33	1995	Florida Department of Health (FDOH) conducted a risk assessment (U.S. Environmental Protection Agency, 2011b).
34	1995	Florida Department of Environmental Protection (FDEP) completed cost recovery on Beazer and Cabot (U.S. Environmental Protection Agency, 2011b).
35*	April 1995	Cabot sued 21 defendants, including the city of Gainesville, for cleanup costs (Magrin, 1996).
36	1996	City of Gainesville paid Cabot \$155,709 to settle their claim (Magrin, 1996).
37	1996	Cabot paid GRU \$238,009 more for Project Jumpstart in order to expel 120,000 gallons a day into GRU's sewer system (Magrin, 1996).
38	Oct 1996	The ruins of Farchan Laboratories is declared a Superfund site (Martin, 1996).
39	1997	Beazer submitted a SFS that included initial investigation results and EPA found this SFS inadequate (U.S. Environmental Protection Agency, 2001a).

Key events are indicated with an asterisk.

Table 4-3. Timeline of events associated with the Cabot-Koppers Superfund site in Gainesville, FL, Phase 3, 1998-2012

Event Number	Time Period/Date	Event
40	4/30/98	Excavating activities were completed for the two wells believed to be on the CK site turned up nothing (Magrin, 1998).
41*	May 1998	A well found from excavation is located over 300 feet under a NW parking lot ("Diggers Locate," 1998).
42	1999	Beazer submitted a revised SFS that EPA subsequently reviewed and amended (U.S. Environmental Protection Agency, 2001a).
43	2000	Cabot performed additional field work in an area where three Floridan aquifer wells used during former Cabot industrial activities were plugged and abandoned (U.S. Environmental Protection Agency, 2011b).
44*	May 2001	The EPA presented a proposed plan for the ROD amendment in a public meeting where both the Gainesville city commission and FDEP expressed concerns that proposed remedy was not sufficient (U.S. Environmental Protection Agency, 2011b).
45*	2004	Contamination is discovered in the Floridan aquifer (U.S. Environmental Protection Agency, 2006).
46	2005	GRU reported toxic chemicals could reach the water supply in next four to five years and Beazer's environmental management disagreed (Swirko, 2005).
47	2006	Test results showed the worst contamination present in deepest areas below site. This contradicted previous thought with respect to the contamination. Beazer thought these results still did not mean any threat for drinking water while GRU felt Beazer needed to conduct more tests to get at a better understanding of the nature of how water travels under the site (Adelson, 2006).
48	2007	The five year review and plan for off-site sampling is submitted (U.S. Environmental Protection Agency, 2011b).

Table 4-3. Continued.

Event Number	Time Period/Date	Event
49	2008	Another FS was submitted (U.S. Environmental Protection Agency, 2011b).
50	4/3/08	Gary Massey lost the lawsuit against former attorney (Crabbe, 2008).
51	August 2009	The draft Koppers FS was completed (City of Gainesville, FL, n.d.).
52	Nov 2009	Public comments are made to the draft Koppers FS (City of Gainesville, FL, n.d.).
53	Dec 2009	Koppers announced an agreement to sell their portion of the CK site to Beazer (U.S. Environmental Protection Agency, 2011b).
54	April 2010	Seven Gainesville residents sued three responsible companies for \$500 million over Superfund site (Smith, 2010d).
55	May 2010	Final Koppers FS completed (City of Gainesville, FL, n.d.).
56	6/1/2010	EPA awarded the technical assistance (TAG) grant to Protect Gainesville Citizens (PGC) (U.S. Environmental Protection Agency, 2011b).
57	7/15/2010	EPA released a proposed plan for cleanup of the CK site (U.S. Environmental Protection Agency, 2011b).
58	8/5/2010	Public meeting was held by EPA in SF community to field questions and concerns about the proposed cleanup plan (U.S. Environmental Protection Agency, 2010).
59	8/16/2010	A submitted draft Community Involvement Plan (CIP) was made available to the public for comment (U.S. Environmental Protection Agency, 2011b).
60	10/1/2010	The modified draft CIP was published (U.S. Environmental Protection Agency, 2011).

Table 4-3. Continued.

Event Number	Time Period/Date	Event
61	Oct 2010	Comments were made to the proposed EPA cleanup by the city and county (City of Gainesville, FL, n.d.).
62*	2/2/2011	ROD was issued and subsequently a press release and summary of the ROD was issued on website (U.S. Environmental Protection Agency, 2011b).
63	4/1/2011	Clean sediment replaced 116 tons of contaminated sediment removed from Hogtown and Springstead Creeks (U.S. Environmental Protection Agency, 2011b).
64	4/14/2011	Negotiations regarding the CD began regarding the remedial design and action for the Koppers portion of the site (U.S. Environmental Protection Agency, 2011b).
65	June 2011	FDOH published a cancer review report for the SF community for the time period 1981-2000 (City of Gainesville, FL, n.d.).
66	December 2011	FDOH published a cancer review report for the SF community for the time period 2000-2008 (City of Gainesville, FL, n.d.).
67	4/21/2012	No agreement has been signed by the responsible parties and no CD has been issued by EPA regarding the most recent ROD issued (Curry, 2012).

Key events are indicated with an asterisk.

Table 4-4. Principal themes associated with each of 11 theoretical constructs associated with resilience in the case of the Stephen Foster community, identified through interviews conducted in 2012 and archival data covering the period 1980-2012

Construct/concept	Theme
Social capital (linking)	Relationships between networks of community members and networks of decision-makers* Relationships between local government agencies, the EPA and community members*
Social capital (bonding)	Discord – factionalism
Social capital (bridging)	Involvement of people and groups outside the SF neighborhood in CK issue
Place attachment	Negative emotions (e.g., anger, fear, frustration, stress) and positive (e.g., satisfaction)* Spatial proximity Stench
Sense of community	Concern over local issues, especially health, property values, delay, and the future of the site* Conflict* Not an isolated issue
Collective action	Communication to catalyze action, to warn local residents about public health issues and to provide information to community members or government officials about the site Calls to action to place pressure on stakeholders through institutional and grassroots channels
Collective efficacy/empowerment	Value of citizen participation relative to the extent of its impact [catalyzing official action or allowing people to blow off steam]* Taking matters into own hands in an attempt to speed up cleanup process and people and groups educating themselves and others in the community*
Social support	Local expertise with regard to the flow of information*

Vulnerability	Historical events before the SF community was developed*
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Table 4-4. Continued.

Construct/concept	Theme
Vulnerability	Inadequacy of science to predict the eventual consequences of CK*
Risk	Magnitude of risk increased over time* Powerlessness*
Trust	Tactical and deliberate delay* Inadequacy/ineffectiveness of government agencies and the bureaucratic process* Skepticism Careful moves to serve institutional agendas/interests and to verify information Accountability/transparency/responsibility

Themes critical to understanding community resilience are indicated with an asterisk.

CHAPTER 5 DISCUSSION

My research originated from a seemingly simple general question: Has resilience developed in the Stephen Foster community in the face of repeated shocks from the Cabot-Koppers Superfund site? I addressed three explicit research questions. (1) How does community context affect the development of community resilience? (2) To what degree does social capital, place attachment, sense of community, collective action, collective efficacy/empowerment, social support, vulnerability, risk and trust contribute to community resilience? (3) Does resilience evolve and change over time, or is it an outcome measurable at a single point in time?

My discussion has four components. I first address ways to improve our understanding of the role of different components in resilience and present a model of the linkages between these components. Second, I discuss the development of resilience in the SF community and provide models of the processes and linkages occurring in this community in each temporal phase described in the results. Third, I examine the importance of context in the community's response to the CK disaster, the nature of the risks associated with toxic exposure, and the importance of sensitivity to context by responding agencies. Fourth, I offer a contribution to the discussion of community resilience as process versus outcome, building on the work of Norris et al. (2008).

A Model of Resilience

The literature concerning community resilience suggests linkages between constructs thought to contribute to resilience. However, no qualitative model exists displaying these connections, although Norris et al.'s (2008) model does display how

constructs from this study contribute to community resilience. Understanding the linkages between processes is important with respect to community resilience. The linkages may be equally or more important than the nature of the processes in contributing to community resilience. I argue that the processes, the linkages between them and how these linkages function internally and externally to the community are not independent. I argue a robust examination of community resilience must consider all three.

Figure 5-1 presents a qualitative, conceptual model of the linkages between processes thought to influence resilience in communities. I base this model on the research literature that discusses linkages between the processes implicitly and explicitly. This model is a first attempt to merge the work of several researchers into a single conceptual framework, drawing on the findings from my study. The model has two distinguishing characteristics, internal and external dimensions of community processes and one-way and two-way linkages between constructs.

My model includes a focus on the degree to which processes are internal or external to the community. The literature implicitly treats internal processes as more important than external ones to resilience. The presence of constructs that contribute to resilience are suggested in the literature to function exclusively internal to the community. Additionally, researchers suggest the presence of these constructs alone contributes to increased resilience. Internal processes are discussed more often by researchers, while external processes receive relatively scant consideration. The literature treats place attachment and sense of community as highly interrelated and largely internal to the community, which my model reflects. I also treat empowerment as

largely internal to the community, as does the research literature, although bonding was the only type of social capital I treated as purely internal.

I found that external processes were at least as important to resilience as internal processes in my research. In my model, linking social capital is external to the community because most linking capital consists of hierarchical relationships between community residents and decision-makers outside the community. The literature treats risk, trust and vulnerability as highly interrelated, which is reflected in my model. The literature suggests vulnerability is internal to the community. This contrasted with my findings that vulnerability in the SF community was contingent upon historical external conditions.

Some processes are both internal and external, including social capital, collective action, social support and uncertainty. I treat bonding social capital as internal, linking as external, and bridging as both internal and external. Social support consisted primarily of expertise that came from within and outside the community. The literature focuses on collective action as an internal process, but I found that collective actions can involve important players from outside the community and can occur primarily outside the community. Uncertainty was a constant in SF and as important to external processes, such as EPA's site assessment, and to internal processes, such as community response. Uncertainty within the community reinforced uncertainty outside the community because uncertainty external to the community stimulated uncertainty within the community and vice versa.

The addition of external and internal processes and linkages in Figure 5-1 reflects both the conclusions of other researchers (Norris et al. 2008, Kirmayer et al.

2009) and my own findings. This model is an attempt to show how the larger social, economic and political forces influence the capacities that operate at the community level. Some linkages between constructs are one-way, but most are two-way as represented in Figure 5-1. The one-way linkages between constructs represent a relationship with a single trajectory, while the two-way linkages between signify a reinforcing relationship between constructs. I show how linkages between processes and their functioning within and outside the community intertwine in ways that contribute to community resilience. Additionally, I offer an explanation of how forces external to the community affect internal community-level processes and vice versa.

The linkages between constructs shown in Figure 5-1 can be positive, negative or have components of both at different points in time. Furthermore, these relationships between constructs can be direct or inverse. For example, increased collective action could have a positive, negative or a simultaneous positive and negative impact on collective efficacy relative to what the collective action is. Therefore, the relationship between collective action and collective efficacy is reinforcing. A reinforcing relationship could result in a number of potential impacts between the two. The relationships additionally evolve over time.

The one-way and two-way relationships are not always constant over time and do not always contribute positively to resilience. The same social process may have a positive impact on some members of the community and not others. These differences were particularly salient in Phase 3 when all the constructs are operative and factionalism became a prevalent characteristic of the SF community. The impact sense of community has on social support, for example, could be very different for different

groups of people within and outside of the community. At a certain point in time, a given relationship may contribute negatively to resilience while contributing positively to resilience at a different point in time.

The linkages in the model presented in Figure 5-1 also suggest there are moderating relationships between constructs. Moderating relationships have several potential combinations of equal or opposite reinforcement. There are relationships between constructs that do not directly moderate one another. The linkages in the model suggest that all of the constructs have direct and indirect moderating relationships. Thus, the model suggests a strong relationship among all constructs, in addition to their contribution to resilience.

The prevalence of two-way connections provides evidence of relationship strength and their contribution to resilience. There are five two-way relationships internal to the community, whereas there are four external to the community and one that was both internal and external to the community. The predominance of two-way relationships internal to the community indicates internal processes have more reinforcing relationships. However, there are more processes that function only external and both internal and external to the community than exclusively internal to the community contributing to resilience in this case.

The one-way connections in the model connect uncertainty and collective efficacy or empowerment, uncertainty and trust, and collective action and vulnerability. Increased uncertainty contributes to increased or decreased collective efficacy or empowerment. For example, uncertainty about the nature and extent of the contamination led community members to educate themselves and others about the

contamination. Uncertainty affects place attachment and sense of community, and collective efficacy or empowerment moderates this relationship. The moderating effects of collective efficacy may be positive or negative. In this study, increased uncertainty that contributed to increased collective efficacy led to a positive sense of community and increased place attachment. The relationship between uncertainty and trust is inverse. Increased uncertainty in the community about the true health impacts from toxic exposure led to skepticism among community residents and decreased trust in decision-makers and the cleanup process. Increased collective actions contribute to decreased vulnerability. For example, increased communication about the issue suppressed the historical conditions that contributed to increased vulnerability.

The remaining connections between processes in the qualitative model are two-way. I highlight the most significant two-way connections and moderating relationships in the qualitative model. There is a reinforcing relationship between place attachment and sense of community. Concern over local issues was a theme that represented sense of community. Increased concerns led to increased negative emotions in the community and vice versa. Sense of community moderates the relationship between place attachment and collective efficacy or empowerment. Increased negative emotions in the community led to increased empowerment by means of an increased sense of community. Additionally, increased collective efficacy or empowerment moderates the relationship between increased negative emotions that lead to increased collective actions.

The relationships between sense of community and empowerment, and empowerment and social support are reinforcing. For example, increased concerns in

the community led to increased collective efficacy or empowerment. There is a two-way relationship between sense of community and social support. Increased concerns in the community contributed to increased social support and increased social support impacted sense of community. For example, increased social support stifled increased conflict in the community. Increased collective efficacy or empowerment contributes to increased social support and vice versa.

While some relationships between processes were relatively simple, there are two particularly complex sets of reinforcing relationships, one internal and one external to the community. The two-way relationships between sense of community, empowerment and social support in the qualitative model represent an important cyclical moderating relationship internal to the community. While each two-way relationship reinforces the processes, their cyclical nature additionally reinforces the moderating relationship between sense of community, empowerment and social support. Social support and collective action additionally relate by means of empowerment. For example, the local expertise provided at community meetings was contingent due, in part, to the perceived value of citizen participation.

Social support and all types of social capital have a two-way relationship where the different social relationships within and outside the community affect the level of social support and vice versa. Linking capital and trust have a two-way relationship where hierarchical relationships affect the level of trust within those relationships. Linking capital moderates the relationship between social support and trust. Trust moderates the relationship between linking capital and collective action, where the nature of hierarchical relationships led to increased or decreased trust and the level of

trust contributes to either increased or decreased collective actions. Collective action has a reinforcing relationship with trust in which the level of trust contributes to the level of collective action.

The second complex, cyclical moderating relationship was between vulnerability, risk, trust and collective action. This relationship functions external to the community. Collective action contributes to mitigating or increasing vulnerability, based on the nature of the collective action. Vulnerability and risk, risk and trust, and trust and collective action all have two-way relationships. Risk moderates the relationship between vulnerability and trust. This moderating relationship is consistent with the literature and my findings in this case. For example, historical conditions of the community caused toxic exposure and thus, vulnerability. This vulnerability caused a health risk that fostered mistrust in the community.

Social Capital

I argue against the emphasis of social capital with respect to its contribution to resilience. Linking capital was the only type of social capital that contributed to community resilience in the case of CK. Linking capital demonstrates the significance of internal and external social processes and their relationship to community resilience. The linked relationships between networks of community members and local and federal agency officials provided a flow of information that traveled up and down the hierarchy. This flow of information was crucial to communicating emergent new information about the contamination to citizen and informing citizens about public meetings where they had the opportunity to present their arguments and evidence in support of their position. The networks outside the community were not any more

important than the networks within the community in terms of contributing to resilience. Rather, the relationship between these networks was of utmost importance.

Place Attachment and Sense of Community

I argue that researchers tend to overlook the potential for negative outcomes with regard to the impacts of sense of community and place attachment on resilience. In the case of CK, the link between place attachment and sense of community was strong and negatively impacted each other and resilience. I assumed that these two constructs would be strongly linked, but did not expect a negative relationship. Conflict and concern over local issues reinforced negative emotions in the community. Emotions and concern over local issues catalyzed collective action, although citizen participation added to the negative relationship between place attachment and sense of community. Conflict, concern over local issues and citizen participation continuously fluctuated back and forth contributing to decreased community resilience.

Collective Action and Collective Efficacy/Empowerment

My conclusions reflect Norris et al.'s (2008) concern about the potential negative effects resulting from collective action. The linkage between collective action and collective efficacy/empowerment serves as a bridge between internal and external community social processes. Collective efficacy/empowerment functioned within the community while collective actions took place within and outside the community in the CK case. Citizen participation contributed to the delay and feelings of stress, frustration and burn out in the community, all of which contributed to decreased community resilience. Collective actions produced little impact, although the participation had high perceived value in the community. Collective efficacy/empowerment contributed to community resilience, but collective action decreased community resilience.

Vulnerability, Risk and Trust

These processes were among the most important in this case, more so than most of the internal processes, although these were not fully emergent until Phase 3 and they functioned external to the community. I argue that the relationship between these processes is more important than their individual contribution to resilience. Trust and risk do not function independently of each other, thus making independent measures difficult. Again, the negative impact on resilience these processes had in the SF community was prevalent. Trust triggered conflict and discord in the SF community and increased vulnerability and risk over time decreased trust and this decrease exacerbated conflict.

Resilience is indicated by several constructs. The nature of the interactions of these constructs, the social processes in the community, contributes to resilience. Also, the nature and extent to which each indicator is present in the community contributes to resilience. “proximal determinants protect only certain individuals, whereas distal effects protect everyone (Norris et al., 2008, p. 145).” Larger forces are not separate from processes within the community, and these interactions contribute to community resilience.

Resilience in the Slowly Unfolding Story of Cabot-Koppers

I identified three phases that represent a series of events that share similar characteristics. In order to explain the factors that contributed to increased or decreased resilience over time, I synthesized the phases with the themes that emerged in the data. I characterized each phase with regard to the constructs that indicate resilience, or a lack thereof. For each phase, I present models for the constructs present, their disaggregated linkages by phase over time and their contribution to resilience (Figures

5-2, 5-3 and 5-4). I based these linkages in each phase on the grand model of construct linkages I identified from the literature with my addition of these constructs' functioning internal and external to the community (Figure 5-1). Finally, I compare and contrast the phases in terms of how resilience functions over time.

Models of Resilience During Three Phases of the Cabot-Koppers Superfund Process in Stephen Foster Community

Model 1

In Phase 1, very few of the indicators of community resilience are operative (Figure 5.2). There were two exceptions, collective action and bridging capital. Community involvement was minimal, yet there were demonstrations during this period. Participants in these demonstrations were mostly outside of the SF neighborhood. This may have been due in part to the local concerns over health and property values were not prevalent in this phase, although become paramount as the story unfolds. This involvement outside of the SF community is why collective action is external to the community in Figure 5-2. Bridging capital during this phase tied the SF neighborhood to broader Gainesville and UF populations, specifically student groups. As a result, bridging capital is displayed in the model of Phase 1 to function both internal and external to the community. Local expertise was important in this phase primarily with regard to local scientists helping the site get listed in the first place (Anonymous, personal communication, August 30, 2012b; Anonymous, personal communication, August 30, 2012c). The collective actions were primarily from groups and individuals outside the immediate SF neighborhood. This means that bridging capital appears to be the most important dimension of social capital only during this time period. There is little

evidence of important relationships that demonstrated linking capital during this phase, although becomes increasingly more important over time.

During this phase, even though public meetings took place, one respondent noticed very minimal participation in these meetings on the part of community members (Anonymous, personal communication, September 27, 2012). Attendance to public meetings by community members who were providing input at these meetings, not just showing up to them, dramatically increased over time. Demonstrations remained infrequent in occurrence and in the number of people who attended over time. Generally speaking, this phase was the quiescent of the three with respect to response at the community level, although laid the groundwork for the way resilience developed over time as the story unfolded.

This phase was a significant precursor to the development of institutional trust that took place over time. Additionally, the delay was evident during this time period. Since the CK site was listed under the Superfund law not long following its inception, the bureaucratic process of assessment, investigation and decision-making inherent to the law was still in its infancy. This contributes to a loss of trust later on as the process is repeated following changes in regulations, sophistication of technology and the resulting emergence of new information. The magnitude of risk increasing over time started in this phase. Finally, the beginnings of linkages between networks are demonstrated in this phase. The evolution of these linkages over time ultimately becomes dominated by linked relationships between networks. Dotted lines in the model of Phase 1 in Figure 5-2 represent the constructs that fully develop in later phases. These constructs are risk, trust and linking capital.

Collective action and bridging capital were the only operative indicators of community resilience in Phase 1, while linking capital, risk and trust fully emerge later in the unfolding story. I expected the linkage between risk and trust since the literature frequently discusses these concepts together due to their relationship. I did not expect all the constructs present to function exclusively external to the community in the entire duration of Phase 1. I also did not expect so many constructs to be absent in any phase. Linking capital, risk and trust were more important than the operative constructs in this phase because they were instrumental in laying the groundwork for how the story unfolded over time. The importance of the underlying constructs was unexpected as well as the emergence of bridging capital and its subsequent near disappearance in the later phases. While few constructs were operative in this phase, the linkages between constructs set the stage for the unfolding process of community resilience.

Model 2

In Phase 2 (Figure 5-3), most of the indicators of community resilience indicators were still absent, although more processes were evident than in Phase 1. All the indicators that were important in this phase contributed to a lack of resilience. The linkages internal to the community were not connected processes external to the community, as Figure 5-3 indicates. The health concerns in the community rose, threatening sense of community. The linkages between networks were not strengthening sense of community in this phase. There was little evidence of significant participation by community members. There was, for the most part, no mobilization in the community. Additionally, the first signs of conflict at the community level took place during this phase. Litigation was the most salient source of these threats to sense of community. Negative emotions increased during this period, threatening place

attachment. This was likely due to the escalation of health concerns in the community. The smell originating from activities on the Koppers portion of the site was another threat to place attachment. People living outside the SF neighborhood recalled being able to smell the site. This damage to the reputation of the site and adjacent neighborhood proved to be important in the history of the CK Superfund site and its effects on SF neighborhood.

Events and processes in this phase were precursors to loss of trust, delay and powerlessness. The dotted lines in Figure 5-3 represent processes that developed fully in later periods. Many of the bureaucratic actions that were prevalent in this phase could fall under the theme careful moves, which refers to particular actions or inactions that were deliberate on the part of institutions to serve their interests and agendas. Even though the government agencies and the responsible parties involved were concerned with being accountable to each other, not the community. Accountability and transparency of the bureaucratic institutions became important later due to the community's perceptions of inadequacy and ineffectiveness on the part of government and the responsible parties. Later, litigation only further delayed the already slowly unfolding process. Even if community members would have been mobilized and participating effectively in the issue during this phase, they were powerless to control the situation because that was in the hands of other decision-makers. There was uncertainty with regard to the extent to which community members influenced the decision-makers.

Place attachment, sense of community and linking capital were the only operative indicators of community resilience, while risk and trust remained underlying in

Phase 2. Bridging capital disappears altogether because community involvement declined in this phase. I expected the linkages between place attachment and sense of community and risk and trust because the literature frequently discusses these concepts together. I expected constructs that function both internally and externally to the community to be present in this phase. I did not expect the linkages between constructs to function either exclusively internal or external to the community. There were no linkages between processes internal to the community and external to the community. While most of the constructs were not operative in this phase, similar to the case in Phase 1, more constructs emerged in this phase that contributed to decreased community resilience. The presence of constructs contributing to decreased resilience is critical to understanding the unfolding story in the SF community.

Model 3

In the model of linkages in Phase 3 (Figure 5-4), linkages between constructs internal to the community were connected to linkages external to the community. This model closely resembles the theoretical model presented in Figure 5-1. In Phase 3, all indicators of community resilience are operative, some indicated resilience in the community and others a lack thereof. There is one exception, the declining importance of bridging capital over time. Bridging capital is only important to resilience in the community in Phase 1 (Figure 5-2), although PGC, , may be an example of bridging capital in Phase 3 since people outside the SF neighborhood were involved in this organization. PGC is a community-based organization awarded grant funding from the EPA to pare down complex technical information and disseminate it to the community. Some respondents pointed to involvement by UF in the past and their absence later, particularly with regard to conducting research. The perceived absence of this institution

and its resources is an apparent contribution to a lack of community resilience. The factionalism within the community represents a threat to bonding capital, decreasing community resilience, although there is little evidence of bonding capital throughout this entire unfolding series of events.

Negative emotions, such as anxiety, frustration and anger, were heightened in the community during this phase. People's spatial proximity to the site was the most important to place attachment during this phase because living closer to the site indicated involvement, typically motivated by an emotional response to the issue. Collective action caused factionalism in the community. This factionalism originated from the negative emotions experienced by community members and decreased community resilience. The discord in the community, represented by the factionalism, lead to increased concerns by members of the community.

All local concerns that represent sense of community were present and intensified during this phase. These local concerns include health issues, property values, delay and the future of the site. These concerns originated from and resulted in strong emotional reactions from community members and contributed to decreased resilience. Additionally, conflict due to factionalism in the community increased, decreasing community resilience. CK was not an isolated issue in the SF neighborhood, nationally or globally. This extension of concerns appears in this phase with respect to increased concern outside the SF neighborhood, comparisons of CK to other Superfund sites across the country, and comparisons to other industrial pollution issues globally. These factors threatened sense of community and contributed to decreased resilience.

Hierarchical linkages between networks were critical to acquiring the best remediation possible for the community. Participation in the decision-making process empowered community members, even though the community was powerless to control the outcome of the situation. This empowerment came from the ability to express their views at public meetings, for example. Participation forced decision-makers to be accountable and transparent. Community members had different perceptions of which decision-makers were trying to be accountable. For example, some community members felt that some officials were accessible and others were not. The expression of views and being part of the decision-making process were in the best interest of the community because they led to the most robust remediation possible. Thus, participation contributed to well-being in the community and subsequently resilience.

Collective actions in this case were predominantly passive and reactive. This may be due in part to the nature of the Superfund process itself. The bureaucratic process of the law is purely reactive to activities and events that have already occurred. The volume of information and communications increased continually over time and contributed to a lack of resilience. The increases in information and communications caused more confusion and discord among those involved, further complicated the situation and contributed to a lack of resilience. Information and communication inherently contribute to the well-being of communities, although the conditions and context of this case proved the opposite. Collective actions, although mostly symbolic, were important in this phase for those involved. Particularly, collective actions were important for the perception of the value of citizen participation in the issue, thus important for contributing to resilience. Therefore, community resilience is contingent

upon the perception of the community being resilient. Community resilience may be all perceived ultimately, inside and outside the community.

People in the community feeling empowered to take matters into their hands was motivated in large part by an attempt to speed up the cleanup process. This theme of empowerment tended to have the opposite effect and furthered the delay. Delay decreases resilience in the community, especially when a valiant effort is made to speed up the process. This caused emotions, particularly frustration and anger, to continually rise. The perceived value of citizen participation varied widely. It can be essential and was on occasion, particularly when community members were educating decision-makers. Citizen participation can lead to a better remediation, although further the delay, presenting an important paradox as part of this slowly unfolding disaster. What matters more to resilience, cleaning the site quickly or remediation of the highest possible quality? The best quality remediation involves delaying the process further. The highest quality remediation may be essential for community resilience while the ensuing delay contributes to decreased community resilience.

The constant additions to the extensive volume of information about the site may be important for resilience because the community is staying informed and it compels decision-makers to remain transparent. On the other hand, the volume of information and its technical nature was overwhelming for those involved in the issue who lacked the expertise to understand the information. PGC helped the community by sifting through this information and making it understandable and accessible to the layman. PGC may have had much more of a positive impact and contributed more to community resilience if they were present prior to the last phase. Norris et al. (2008) discusses how

resources have to be robust, rapid or redundant to foster resilience. Information was an important resource in this case and overwhelmingly demonstrated robustness and redundancy, both of which contributed to a lack of resilience. Rapidity was impossible in this case because the process has been so drawn out. This finding is inconsistent with Norris et al. (2008), although their study provides a very basic discussion of this concept.

Local expertise, an indicator of social support, helped catalyze investigation in this phase. Investigation continued as new information about the nature and extent of the contamination emerged. As scientific testing became more sophisticated, the nature of the contamination was found to be very complex to remediate. In this phase, outside experts asked to make recommendations to local experts about how to deal with the contamination. This example of the community taking matters into their own hands contributed to resilience, although citizen participation contributed to delay. The drawn out nature of the issue decreased resilience.

Vulnerability appears during this phase. Historical events and the increasing adequacy of science over time revealed the unpreventable and unknowing nature of the disaster. The community was unable to protect itself from the inevitable contamination. Therefore, community resilience had to happen reactively to these historical events. Ultimately, it may have been too late for the community to mitigate the worst impacts of the disaster once the available science became sophisticated enough to adequately deal with the complexity of the contamination.

Risk emerged fully in Phase 3 following its underlying presence in the previous two phases. The magnitude of risk increased over time as new information emerged,

decreasing resilience. Community members felt powerless due to a lack of control over the situation, despite their level of involvement and the quality of their participation. This powerlessness resulted in a desire to take action. This powerlessness also resulted in litigation that delayed the cleanup process and decreased resilience.

Trust also emerged completely in Phase 3 after underlying the social processes in Phases 1 and 2. The loss of trust over time in government agencies and the bureaucratic process and among members of the community furthered delay, decreasing resilience. Community members felt skeptical of the adequacy and effectiveness of government and others involved in the community. This skepticism exacerbated the factionalism in the community. Decision makers perceived this skepticism and their actions became more calculated over time, resulting more often than not in stalling action. Stalling action would prevent misrepresentation in an effort to prevent making the skepticism and conflict worse. These careful moves on the part of decision makers furthered the delay causing decreased community resilience.

All the constructs I anticipated to be present in the study were operative in Phase 3, represented in Figure 5-4. Most of the operative constructs contributed to decreased community resilience. This was an important finding since the literature suggests the presence of these constructs contributes positively to community resilience. Most of the constructs that contributed to increased resilience, collective efficacy/empowerment and social support, both increased and decreased resilience. These constructs' contribution to increased and decreased resilience led me to conclude that resilience is both present and absent in the SF community. The models in Figure 5.4 and 5.1 are very similar, including most of the linkages the literature suggests.

Comparisons and Contrasts of Phases over Time

Bridging capital decreased in importance over time. Bridging capital was important for resilience in Phase 1 and its absence by Phase 3 may have contributed to decreased resilience. Linking capital was underlying in Phase 1, emerged in Phase 2 and ultimately became paramount in Phase 3. Perhaps the increase in information about the site made these linked relationships between networks important for community resilience. Bonding capital was not present as much as other constructs in this series of unfolding events. The factionalism that developed in the community by Phase 3 indicated a lack of bonding capital and decreased resilience.

The absence of place attachment in Phase 2 decreased resilience. Place attachment in Phase 3 originated predominantly from negative emotions and thus, contributed to decreased resilience in the community. These emotions came from health concerns in Phase 2 due to the smell coming from industrial activities when the Koppers site was still operating. Concerns over health issues and property values caused intense negative emotions in the community in Phase 3. Only a couple SF neighborhood respondents reported positive emotions about living in close proximity to the site. Health concerns and conflict threatened sense of community in Phase 2. These became more threatening to sense of community by Phase 3. Also, local concerns over property values, delay and the future of the site emerged in Phase 3. CK not being an isolated issue was prevalent in Phases 1 and 2 with respect to other pollution issues in the community such as Fairbanks and Farchan. Also, CK not being an isolated issue is expressed by the increased concern outside the SF neighborhood and industrial pollution being a national and global issue in Phase 3. Place attachment and sense of community decreased resilience over time.

Collective action was present in Phase 1, dropped in Phase 2 and dramatically increased in Phase 3. There was predominantly outside involvement in the issue in Phase 1 and mostly SF neighborhood involvement in Phase 3. These differences in collective action over time are evidenced in the placement of collective action external to the community in the model of Phase 1 in Figure 5-2 and the shift to internal and external functioning by Phase 3 in Figure 5-4. Even though collective action appears to have contributed to increased resilience in Phase 1, this may have been due in part to the minimal involvement and because those who were involved for the most part did not live in the SF neighborhood. Information traveled more from resident to government officials in the first two phases, while in Phase 3 communications went mostly from the official level down to the community level and within the community from community member to community member. Calls to action remained relatively consistent throughout all three phases. The reactive and passive nature of collective actions throughout all three phases led to collective action, ultimately decreasing resilience.

Collective efficacy did not become important for community resilience until Phase 3, although it delayed the cleanup process further, decreasing resilience. There was an overwhelming perceived high value of citizen participation among interview respondents. Differences in perceptions among respondents were in their perception of the actual impacts of participation. There was uncertainty as to whether citizen involvement had an impact on the cleanup process or may have just been an outlet for those who participated. People in the community taking matters into their own hands dramatically increased in Phase 3. This tended to further the delay and decreased resilience.

Social support became important in Phase 3. In Phase 3, the information coming from local experts and PGC to the community and bureaucratic officials helped catalyze further investigation. Local experts felt the need to seek outside experts to understand the potential effects of the contamination. These examples of social support were important for the community and institutions to get accurate information. Social support was also necessary for the site to receive the best remediation possible, although further investigation delayed the process further. This both increased and decreased community resilience.

Vulnerability, risk and trust all fully emerged in Phase 3. Historical events far before the site listing paved the way for vulnerability to be able to appear. Dumping chemicals from the former Cabot site into Hogtown Creek was an example of one such event. Scientific sophistication over time allowed scientists and citizens to understand the nature and extent of the contamination. Vulnerability, risk and trust all added to delay and decreased community resilience. The perceived lack of control over the situation in the community led to distrust and powerlessness. This lack of trust and powerlessness caused heightened emotions in the community that ultimately led to factionalism and thus, decreased resilience.

Phases 1 and 2 were similar with regard to the linkages between constructs, while Phase 3 highly contrasted with Phases 1 and 2. Few constructs were operative in the first two phases, while all were operative in the last phase. Phases 1 and 2 both displayed underlying evidence of risk and trust represented by the dotted lines in Figures 5-2 and 5-3 and became fully realized in Phase 3 (see Figure 5-4). All the constructs present in Phase 1 were external to the community with the exception of

bridging capital, which functioned internal and external to the community. There were no linkages between internal and external processes in Phase 2. This contrasts with Phase 3 because it is a very sophisticated representation of the connections between the constructs and how they function internally and externally to the community. The linkages in the model of Phase 3 (see Figure 5-4) closely mirror the initial model (see Figure 5-1) of linkages suggested by the literature.

Resilience in the Context of Cabot-Koppers

My findings show that resilience has not occurred in the community. Resilience in this case is inconsistent over time. In Phase 1 resilience increased, it decreased in Phase 2 and some processes increased resilience in Phase 3 while others decreased resilience. The distinctions in occurrences of resilience for different groups of people were relative to the issue's evolution over time. Different resilient outcomes over time were also relative to how community processes were experienced and prioritized differently over time.

The type and level of involvement dictated what type and level of knowledge people had, as well as their perspective on the issue. The emergence of new information over time influenced involvement in the issue. Additional testing generated new information about the extent of the contamination, for example. As technology advanced, regulations also became more stringent requiring additional testing. As new information emerged, community members also called for additional testing and immediate action. Events unfolded cyclically. The cyclical nature of events is very important because this is distinct from most other disasters. Commonly, disasters reach a peak followed by a long recovery period. There have been a few major peaks in the unfolding story of CK that surrounded watershed events. These peaks have increased

in intensity over time as new information about the extent of the contamination was discovered.

The expert perspective provided at community meetings to the EPA, responsible party and community members prolonged the situation, due to the call for additional testing and recrudescence of the cleanup plan, although paramount in getting the most appropriate remediation possible. This is pivotal to community resilience being both present and not simultaneously. Expert perspective adds to the uncertainty of the situation because stakeholders lined up on different sides of the issue. Different people held competing perspectives on what remediation should be done and how much of an impact on public health the contamination truly has to those living in close proximity to the site. Sifting through all the perspectives and information available means the average community member has to figure out where they stand.

Emotional reactions to the emergent information and a lack of concern or time to sift through the plethora of information regarding the site, that increased in volume over time, added to the perspective a community member adopted. This is so because the emergent information affects feelings of community members and actions they would take. The more a community member was involved in the issue, the more likely they were to feel burned out, frustrated and passionate about the issue. This additionally complicated the issue further. Community members wanted reassurance above all in the face of uncertainty. There were new discoveries about the contamination that raised flags but were never quite enough of a threat to demand immediate action, just immediate attention. Attention meaning discussion about decision-making before any decisions were made or action was taken. The contamination being not quite enough

led to not enough action on the part of government and not quite enough information being known, causing a sense of inadequacy, or falling short. This surrounded the lack of remedial action, further complicating the issue, drawing it out further and creating more frustration.

Standards for cleanup become more stringent over time while more about the extent and nature of the contamination is discovered and understood more over time. This caused more conversations and studies that need to take place and further complicated the issue, drawing it out more, thus creating more frustration and sometimes participation. This participation varied by type and the people involved changed and evolved over time. Again, this cyclical nature of the unfolding events created paradoxical community resilience. Community resilience is there and also not there.

Over time, test after test provided new information and re-examining the cleanup plan. This cycle then repeated many times. This is in itself cyclical because returning to the plan creates the need for more testing in order to collect more data about the nature and extent of the contamination. This testing is done so the final remedy is the most adequate, effective and appropriate that it can possibly be. The site itself went through one after another EPA regional manager about every five years. This meant a person with no previous knowledge of the site and an assignment including many Superfund sites in the region has to start the learning process from scratch. Stakeholder went through proposed cleanup plan after plan over time. Citizen participation caused the situation to be even more drawn out because it resulted in calling for more accountability and transparency of government officials and the responsible party,

including a return to the remedial plan. This process is very time consuming and citizen participation in itself is time consuming. The more people that get involved and the more an individual increases their involvement, the longer the process takes and the more drawn out the situation becomes. This cycle took place multiple times in the CK story. The inherent drawn out nature of the Superfund process and this case is directly because of this cyclical process. This cycle also very much parallels the social-ecological perspective used as a lens to explore community resilience in the present study.

The Importance of Shared History and Context

Shared history and community context are important to understanding community resilience during and after drawn out disasters. Some researchers omit shared history and context from the discussion of community response to technological disasters, particularly those who focus on national or international responses (Bruneau et al., 2003; Reid et al., 2012; Srivastava, 2008; Yamamura, 2012). However, other authors draw attention to the importance of a community's shared history, community and cultural context in understanding response to drawn-out disasters (Cline et al., 2010; Harper, 2007; Mix & Shriver, 2007). Kirmayer et al. (2009), for example, conclude, "each model of resilience must be evaluated in terms of its relevance to a particular community's history, current situation and future development" (p. 102).

The Oak Ridge community's dependence on the Tennessee Valley Authority for employment and economic growth provides an example of the importance of shared history and community context. Harper (2007) concluded that to explore and address the environmental health hazards in the Oak Ridge community, the community's secretive history has to be appreciated and recognized (p. 62). Discord between Oak

Ridge residents emerged from those who believe their health issues came from exposure related to their occupation and those who had no adverse health impacts (Harper, 2007; Mix & Shriver, 2007). The outsider perspective of Oak Ridge as a toxic wasteland (Harper, 2007, p. 61) contrasted the community members' belief that Oak Ridge maintained global peace and provided the U.S. with economic prosperity (Harper, 2007, p. 61). These conflicting perspectives within and outside the community are best understood considering the shared history and community context of Oak Ridge.

The Libby, MT shared history of strong social support before the disaster occurred provides an example of the significance of community context. Cline et al. (2010) concluded that the community's history and cultural values of supporting each other caused the community members to expect social support; the provision of this support failed during the drawn-out disaster. Cline et al. (2010) characterized this community as experiencing deterioration of previous community support, a process in which conflict appeared to play a role. The nature of this conflict closely paralleled that of Oak Ridge. Those who did not experience adverse health impacts were skeptical of those who did. The shared history of the community is critical to understanding the fate of social support in Libby, MT.

Similarly, the shared history of industry in North Providence, RI is vital to understanding the community's consensual response to a contaminated river. Community consensus resulted, despite residents and officials failing to mutually enter into the decision-making process. "Instead, government agencies and elected officials constructed official versions of risk, then created the impression of collaboration with local citizens, meanwhile engaging in decision making... (Zavestoski et al., 2002, p.

404).” However, residents in the community knew the contamination existed before the EPA discovered the problem because they were thoroughly familiar with the river’s historic use for industrial activities (Zavestoski et al., 2002, p. 403). Both the characteristics of the community and the nature of the official response led to the community’s response.

The community context in the case of CK consists of local expertise in a town with a major university. Substantial scientific knowledge, particularly that of environmental science was available to the community. The local expertise may have contributed to the conflict in this case. There was conflict in the community among residents who were skeptical of those who claimed they suffered adverse health impacts. This is similar to the nature of the community conflict in the Oak Ridge and Libby, MT cases.

Gainesville is known for substantial citizen involvement, regardless of the issue. The high quality of the citizen participation in this case furthered delay in resolving how to deal with the pollution at the CK site. Providing more information led to an increase in investigation and revisiting the cleanup plan, all of which is extremely time consuming. Understanding the context of Gainesville is instrumental to understanding the community’s response.

The context of the community and its shared history are influential in a community’s response and resilience. This is true in cases when the community response is that of consensus or discord, although community conflict is the dominant response to drawn out technological disasters. This conflict comes from differences in risk perception of contamination in communities. The differences in risk perception are

due to the inability to establish a causal relationship between the contamination and reported health impacts. Ultimately, this adds to the frustration felt by community members and adds to the uncertainty of the situation. Context sheds light on the resilient outcomes of a given community over time despite the situation's uncertainty.

Toxic Exposure Adds to the Complexity of the Disaster and Uncertainty in the Community

Toxic exposure causes stress and adds to the complexity of the disaster and uncertainty in the community, all of which are exacerbated over time. Stress, conflict and risk are closely related in the context of chronic technological disasters. Stress from the perceived risk of toxic exposure creates conflict. Uncertainty pervades stress, conflict, risk and all other social processes in the community. These relationships are exacerbated in drawn out technological disasters. Some other authors have reached similar conclusions.

Culley, Zorland, and Freire (2010) point out, "...disagreements about risk would likely exacerbate stress and conflict..." (p. 888). The stress experienced by community members from the uncertainty of risk to toxic exposure adds to the complexity of the situation and thus, uncertainty. This progression is dynamic and creates community conflict or exacerbates the existing discord.

Vandermoere (2006) studied stress related to contaminated soil excavation in a community. He concluded, "...the stressful nature of the transformation of private property produced by the process of soil excavation and by residents' need for risk information as it arose from the controversies surrounding the risk status of the chemicals" (p. 735). Perceived risk from toxic exposure and the community members' need for communication about the risk caused stress in this case. The uncertainty in

this example was associated with temporary displacement of community members and their resulting stress.

Cline et al. (2010) concluded that toxic exposure is a catalyzing stressor. However, they also argue that toxic exposure affects social and symbolic processes such as meanings, interpretations and attributions that have an impact on community response to disasters. These impacts have been underestimated. The researchers claim that this may particularly true for slow-motion technological disasters with the potential to damage the social fabric of a community (Cline et al., 2010, p. 13). Toxic exposure, social processes and the drawn out nature of technological disasters have a damaging impact on community response.

In the CK context, the symbolic and social processes seemed to have more impact than toxic exposure per se with regard to community response to the disaster, although toxic exposure was important. Nearly every respondent said that health issues were a major concern. Nearly all concurred that establishing causation between the contamination from the site and health problems in the community was difficult, perhaps futile. In addition to health concerns, almost all respondents said that the effects on property values were a major concern.

Toxic exposure and stress experienced by community members exacerbates the complexity of the disaster and uncertainty in the community over time. This is important to understanding community response and resilience to chronic technological disasters, although I would argue community context is more important. The nature of the toxic exposure and the extent of the complexity of the contamination is an important component of the context of the disaster. The risk posed to a community from toxic

exposure and the residents' resulting stress and the overall pervading uncertainty of the situation are all factors of the community context. Thus, the context is the overarching consideration of community response and resilience.

Agency Understanding of Community Context

Agencies' knowledge, understanding and sensitivity to the context of the community enhance their response to the disaster. The interactions between community members and officials can cause stress for community members. Conflict is common within communities and between agency officials and community residents. These conflicts can have detrimental impacts on the community and may ultimately contribute to a lack of resilience.

Agencies should understand the evolution of social processes in communities impacted by chronic technological disasters to respond effectively. Cline et al. (2010) conclude that understanding the evolution of social processes in slow-motion technological disasters may be critical to effective community and agency responses. Members of the community must continue to live together despite the torn social fabric. Agency approaches to a community impacted by a disaster have a tendency to focus on toxic exposure, not the social processes of the community. Cline et al. (2010) conclude that the, "...focus on resolving technical issues...may fail to sufficiently appreciate and address the role of the social environment in traumatic stress experienced by community members" (p. 13). Similarly, Safford et al. (2012) conclude, "...a failure to understand and "respond" to the social, institutional, and political context in which they operate could limit their effectiveness and inhibit their ability to serve affected communities" (p. 37). Therefore, the common nature of agency responses may contribute to decreased community resilience.

The community and agency responses in SF occurred in the cost of to a highly educated community with extensive expertise in the environmental sciences. CK ultimately became a model for EPA's community involvement program. EPA used the case of CK to model implementation of the community involvement program in other U.S. communities with Superfund sites. Using CK as a model may be due in part to the important role of linking capital in this case. The hierarchal relationships were crucial to communicating information about the contamination. The flow of information from community to city and county, and ultimately to the EPA and back down to the community, was critical to understanding the unfolding events in this case and the social processes that contributed to resilience.

Overall, community context may be the most critical aspect of understanding resilience in communities that face drawn-out, technological disasters. Context is probably more important than how the community and agency respond to the disaster, especially given the role of toxic exposure in creating prolonged stress and anxiety. I would argue that social processes are a primary component of community context. Agencies' understanding of and ability to respond to these processes therefore may be the most critical effect of agency response on resilience.

Resilience is an Embedded Process over Time

Some researchers conceptualize community resilience as an outcome. Other researchers conceptualize community resilience as a process. Changes in the community social processes over time contribute to community resilience.

“Communities experience constant change from multiple sources. As change is constant, no community can presume a future without change (Magis, 2010, p. 413).”

Different levels of resilience are demonstrated in a community in different outcomes over time. Cline et al. (2010) argues, "...slowly evolving technological disasters necessarily mean that the entire community is not affected in the same ways at the same time" (p. 13). In the case of Cline et al. (2010) the discord in the community was over the existence of the disaster itself because some people experienced health problems, while others did not. This uncertainty fed the conflict within and outside the community and negative emotions in the community, all of which evolved over time.

Change over time is critical to a robust assessment of community resilience. Lee and Blanchard (2012) investigated a disaster that remains in its infancy with respect to the impacts felt in affected communities over time. The researchers acknowledge the fact that this disaster is in its early stages by pointing out, "...the relationships reported here may change over time as the initial event becomes more distant" (Lee & Blanchard, 2012, p. 41). I would argue the inevitable change over time remains to be seen in this case. Understanding community resilience is contingent upon an unfolding story because it is a process that varies over time. Community resilience does not have a single trajectory over time. There are distinct outcomes within a process of community resilience as evidenced in the present study by the linkages between constructs, their functioning internal and external to the community and their contribution to increased or decreased resilience.

Constructs relate to resilience in positive, negative, direct and indirect ways because of change over time. Mix and Shriver (2007) conclude:

Over time, community social patterns change, community groups become polarized, new leaders emerge, organizations form and informal and formal communications improve or worsen. Such changes affect the nature and

perception of environmental hazards as individuals and communities define ambiguous situations continually. (p. 642)

The nature of the relationships of constructs to resilience is best understood as an evolutionary process over time.

I adopted the claim of Norris et al. (2008) that resilience is better conceptualized as a process. I conclude that there are distinct resilient outcomes of community resilience that are nonlinear and culminate in an embedded process over time. This conclusion is evidenced in my identification of three distinct phases in time. Each phase has distinct and specific resilient outcomes. The salience of the constructs and their contribution to community resilience are distinguishable in each phase.

Some constructs are related to resilience in both positive and negative ways, and some in direct and indirect ways. Some constructs contribute to increased or decreased community resilience. Some constructs were not present during a particular phase but were indirectly related to resilience. The lack of presence of some constructs within a distinct outcome does not mean these constructs do not contribute to resilience. When the process in its entirety is examined, these constructs may reveal themselves in different outcomes or be related to resilience in indirect ways.

Vulnerability, risk and trust were not present during most of the unfolding story, although events occurred during the first two phases that laid the groundwork for these constructs to become fully realized. This does not mean vulnerability, risk and trust in this context were not important in explaining resilience. These constructs were among the most salient. The unfolding events over time, once examined closely, revealed distinct resilient outcomes. Vulnerability, risk and trust were indirectly related to resilience for most of the story. The development leading to their emergence in Phase 3

was critical to explaining community resilience. This evidence corroborates my conclusion that community resilience is a process of outcomes over time that reveals the relationships of certain constructs and the nature of these relationships.

Community resilience is an embedded process of outcomes over time. Distinct resilient outcomes can be identified in the unfolding process over time. The changes in community social processes over time cause constructs to relate in positive and negative, and direct and indirect ways. The linkages between constructs and their functioning internal and external to the community are also important considerations of community resilience.

Limitations, Implications for Practice and Directions for Future Research

There were three major limitations of this study. The methodology section mentioned the first two previously (see Chapter 3), the single case study design and the retrospective interview data. The third limitation of this study was my own subjectivity as a researcher. First, multiple case study designs are commonly more robust than single case designs. Despite the general advantage of multiple cases, Yin (2009) points out that longitudinal data rationalizes the choice to use a single case. Also, the two methodological stages I used provided a more robust approach to investigating community resilience than one stage alone could have provided. Next, the retrospective information provided in the interviews was a limitation. Respondents recalled information about events that already happened. They could have remembered events differently after time passed and their feelings about the issue also could have affected their memory. Respondents may have subscribed to a certain perspective or only knew certain information based on the nature of their involvement in the issue. I interviewed people within and outside the community and with various levels and types of

involvement in the issue in an effort to collect the fullest range of perspectives on this issue possible. Finally, my own subjectivity as a researcher influenced the conclusions I reached. This limitation was predominant in this study because all the data were qualitative. The data were subject to my interpretations, but I did employ verification procedures. Participants verified my interview summaries and two researchers completed the data analysis procedure three times with me. These measures were taken to ensure the accuracy of my findings and interpretation of those findings.

I identified three primary implications for practice from this study, the need to focus on community social processes, the need to prepare for long-term intervention in communities, and the need for interventions tailored to the community's context. First, my findings suggest social processes in the community are highly related and a focus on these processes can help foster resilience. I recommend an equal focus on the social processes internal and external to the community. Furthermore, I found that resilience outcomes are very different at different points in time in an unfolding process. Since resilience is an evolving process over time, post-disaster interventions in communities are more effective if they are long term and focus on achieving specific resilient outcomes at different points in time. Finally, interventions need to be tailored to the context of the community. The highly educated community of Gainesville was an important contextual factor in my study. Therefore, the same Superfund site in a different community could have potentially very different outcomes with regard to resilience, particularly in the absence of a valuable institutional resource such as the University of Florida. Another critical contextual factor in the case of CK was the negative emotions SF community members experienced fueled their participation in the

issue. Negativity experienced by community members increased resilience in this case, although this may not be true in all cases. Different communities have different needs situated in their context and require interventions tailored to these needs. Agencies and mental health professionals must remain sensitive to a community's context in order to improve community response to disaster and ultimately, foster resilience.

There are several opportunities for future research on community resilience to disaster. First, the model I provided in Figure 5-1 should be tested to determine its effectiveness in understanding other disaster and community contexts. Researchers should further explore the linkages between constructs should be explored further and the importance of internal versus external processes. These explorations would inform how to foster community resilience. More studies should analyze and interpret longitudinal data even if they are retrospective because resilience is a process over time. Dividing the data into periods of time similar to this study would provide a meaningful comparison of how resilience evolves over time in specific outcomes. Neighborhood comparisons over time should additionally be explored to improve community response to disaster in ways that can foster resilience.

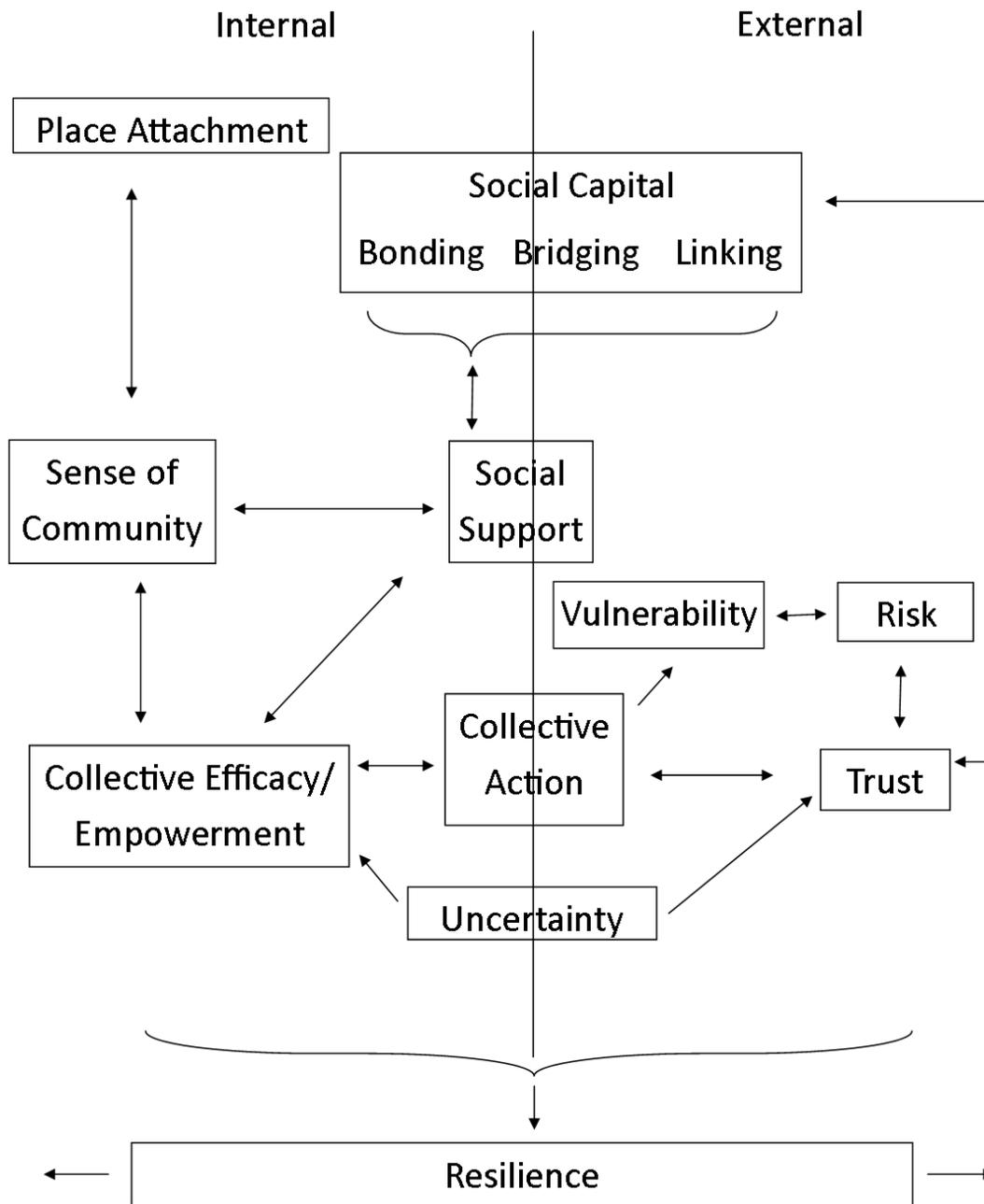


Figure 5-3. Model of Stephen Foster community social processes based on the results and the construct linkages suggested by the literature reviewed to contribute to resilience

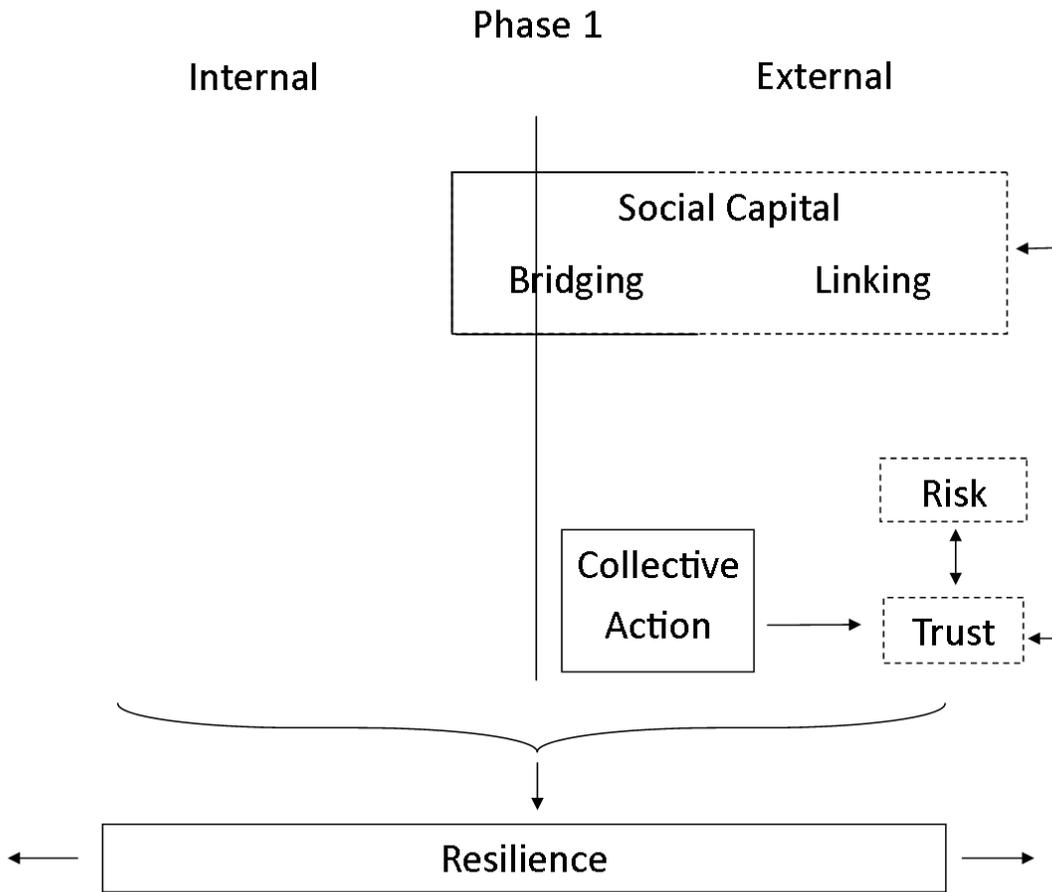


Figure 5-4. Model of Stephen Foster community social processes that contribute to resilience, Phase 1, 1980-1991

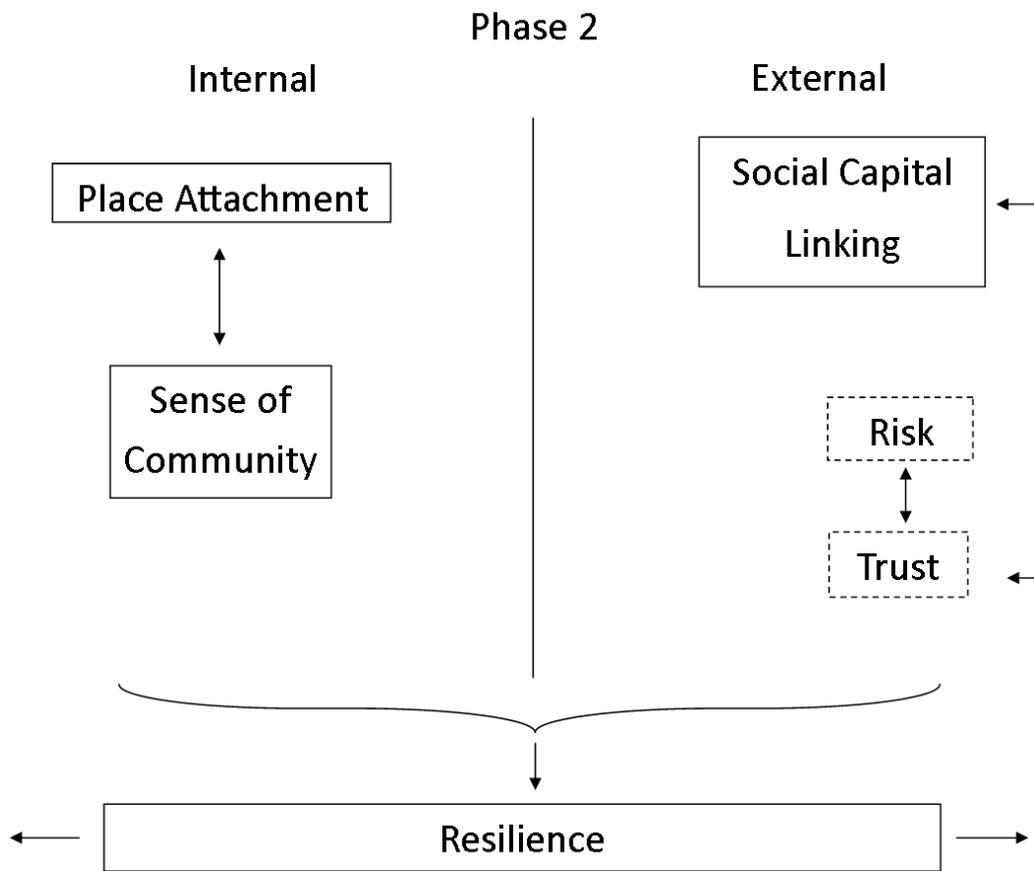


Figure 5-5. Model of Stephen Foster community social processes that contribute to resilience, Phase 2, 1991-1997

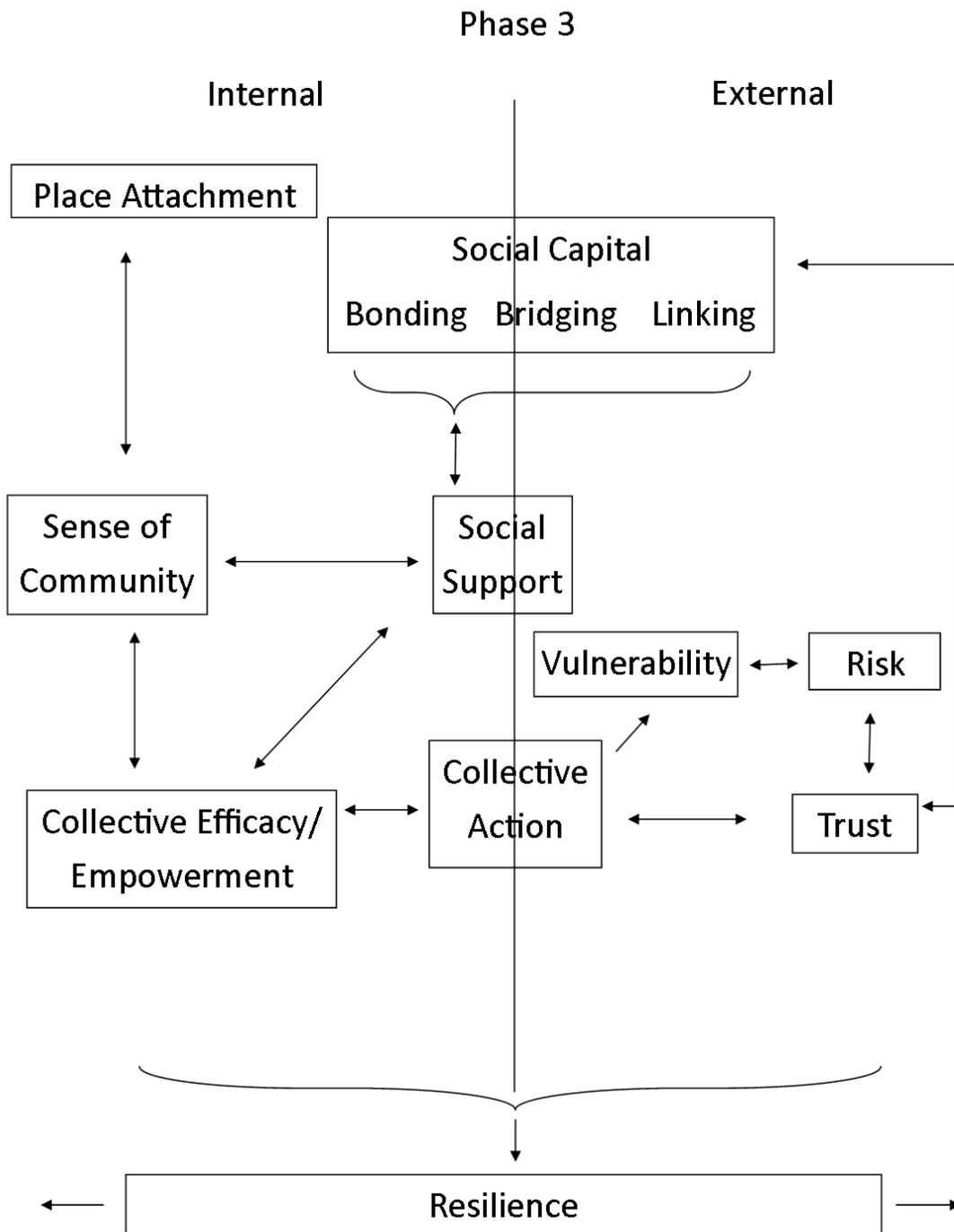


Figure 5-4. Model of Stephen Foster community social processes that contribute to resilience, Phase 3, 1998-2012

APPENDIX A
INTERVIEW GUIDE

1. If the participant does live/ has lived in the Gainesville community, what is the total number of years you have lived/did live in the Gainesville, FL community?
_____ years

If less than 5 years, go directly to 1A, otherwise fill out contact info from participant after all other questions have been asked

Topic One: Awareness

2. When did you first become aware of the Cabot-Koppers Superfund site? Before or after the NPL listing (1983)?
 - a. Follow-up: What issues [site designation, slow cleanup, community involvement] did you initially become aware of?
3. What have the effects of the Cabot-Koppers Superfund site listing and subsequent cleanup process been in the Gainesville, FL community?
 - a. If the participant speaks to **citizen participation, citizen involvement, people coming together, etc.** then skip to **Topic Three** questions # 7-12. Once completed return to **Topic Two** questions # 4-6. Finish with background information questions # 13-15.
 - b. If the participant speaks to **property values, people feeling trapped, people feeling stuck, etc.** then continue in order to **Topic Two** questions # 4-6. Once completed continue to **Topic Three** questions # 7-12. Finish with background information questions # 13-15.

Topic Two: Issues

4. Since the process of cleaning up the site has been going on for a long time, what were the key points of the issue unfolding from your perspective?
 - a. Follow-up: How did these issues evolve [change, become alleviated, spark community organization] over time?

5. What are the major concerns in your community that arose from the circumstances surrounding the Cabot-Koppers Superfund site in Gainesville, FL?
6. How do you feel about where you live currently considering the Cabot-Koppers Superfund site?
 - a. Follow-up: Have these feelings changed since the site was first listed in 1983?
 - i. If **YES**, how have your feelings changed [up, down] with respect to where you live and have lived since the site was first listed?
 - ii. If **NO [verify it's stayed the same]**, then are you saying your feelings about where you live have stayed the same since the site was first listed in 1983?

Topic Three: Involvement

7. What was the nature of your involvement with the Cabot-Koppers Superfund site issue (dating back to 1983 if possible)?
 - a. Follow-up: How involved were you with this issue?
 - i. If **YES**, what community organizations do/did you belong to that address/ed the effects of the Cabot-Koppers Superfund site listing (dating back to 1983)?
 - ii. If **NO**, what community organizations are/were you aware of that address/ed the effects of the Cabot-Koppers Superfund site listing (dating back to 1983)?
8. What is your current perception of the value of citizen participation in the issue?
 - a. Has this perception changed since the site listing in 1983?
 - i. If **YES**, in what ways?
 - ii. If **NO**, why?
9. What community-based organizations formed in response to the issue?

- a. Follow-up: How long did these organizations stay in existence?
- b. Follow-up: What was the nature of their involvement [formal, informal] in the issue?
- c. Follow-up: Did existing organizations respond to the issue?

10. Currently, are members of your community confident in the ability of organizations based in your community to effectively organize surrounding this issue?

- a. Has this confidence changed since the site listing in 1983?
 - i. If **YES**, in what ways has this confidence changed over time among members of the community?
 - ii. If **NO [verify it's stayed the same]**, then are you saying the confidence of the community in the ability of grassroots organizations to effectively organize has stayed the same since the site listing in 1983?

11. What keeps people in the community from getting more involved?

- a. Follow-up: Are they afraid of a negative outcome [for them personally, for the community as a whole, nothing happening at all]?

12. What are the most important resources, to people and groups, currently in your community with respect to the magnitude and impacts resulting from the Cabot-Koppers Superfund site listing?

- a. Follow-up: Why are these resources the most important?
- b. Follow-up: What did they offer the community from your perspective?
- c. Follow-up: Have the most important resources changed since the listing in 1983?
- d. Follow-up: Are these resources [currently; historically] accessible by everyone equally in your community? Why or why not?
- e. Follow-up: What other kinds of resources are available but not as important?

Background information questions:

13. What is your gender?

14. What specific neighborhood do you currently live in? Please provide past neighborhoods you lived in dating back to 1983 to the best of your ability.

15. What is your current occupation? Please provide past occupations held dating back to 1983 to the best of your ability.

1A Ask how the respondent is knowledgeable about the site (eg. from living in the Stephen Foster neighborhood) and if he/she knows any community members who have knowledge of events and processes that have occurred as a result of the Cabot-Koppers Superfund site listing that have lived/did live in Gainesville for more than 5 years. Request contact information and end the interview.

Name: _____

Phone: _____

E-mail: _____

Name: _____

Phone: _____

E-mail: _____

Name: _____

Phone: _____

E-mail: _____

APPENDIX B DEFINITIONS OF CONSTRUCTS

- **Resilience** – the ability of a system (eg. community) to sustain repeated shocks and adapt to new conditions that may present themselves as a result; occasionally, transformation (with regard to fundamental changes in the nature of structure and function of the system) is necessary for the system to have the capacity to adapt to the new conditions
- **Social capital** – formal and informal network participation based on access to resources (eg. symbolic, economic, cultural)
- **Bonding capital** – close personal ties with regard to trust (trust built on shared interest NOT trust as defined below) and norms of reciprocity within groups that reinforces those ties
- **Bridging capital** – relationships among networks that creates ties to other informal and formal networks that share a set of resources
- **Linking capital** – relationships between groups and authority figures that reinforces ties based on hierarchal relationships
- **Place attachment** – emotional attachment to the physical place in which you live
- **Sense of community** – attachment to the social aspects of the community (concern for issues in the community) in which you live
- **Collective action** – participation by community members in formal and informal organizations which can result in consensus (eg. formation of grassroots organizations) or dissensus (eg. conflict, mistrust that creates barriers to action) in the community
- **Collective efficacy/ empowerment** – the belief that citizen participation is a worthwhile effort that will produce perceived control over the institutions that affect one's community
- **Social support** – a community-level protective process of social ties that act as a buffer against adverse outcomes resulting from hardships which varies by source (eg. family, friends) and type of support (perceived, received; emotional, informational, tangible)
- **Vulnerability** – a condition of a given community that exists prior to a traumatic event which can impede the adaptive capacity of that community after experiencing a traumatic event
- **Risk** – possibility of exposure of something or someone valued (economic, symbolic, cultural) to danger, harm or loss

- **Trust** – belief in the reliability of institutions based on the perceived legitimacy of those institutions

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BIOGRAPHICAL SKETCH

Megan Donovan was born and raised in Nashua, New Hampshire. She graduated from Bishop Guertin High School in 2004. She attended Emerson College as an undergraduate and received a B.A. in Film Production in December 2007. She then attended the University of Florida pursuing a Master of Science degree. She will pursue a career in community organizing fulfilling her desire of working with youth in an educational nonprofit setting.