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Adaptive water governance and community resilience: Assessing the impact of the Cache River Wetlands Joint Venture Partnership on communities in the Cache River Watershed of southern Illinois

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ADAPTIVE WATER GOVERNANCE AND COMMUNITY RESILIENCE: ASSESSING THE
IMPACT OF THE CACHE RIVER WETLANDS JOINT VENTURE PARTNERSHIP ON
COMMUNITIES IN THE CACHE RIVER WATERSHED OF SOUTHERN ILLINOIS

by
Rachel Emeline Boucher
B.S., Southern Illinois University, 2015

A Thesis
Submitted in Partial Fulfillment of the Requirements for the
Master of Science Degree

Department of Forestry
in the Graduate School
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THESIS APPROVAL

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Master of Science
in the field of Forestry

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AN ABSTRACT OF THE THESIS OF

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**TITLE: ADAPTIVE WATER GOVERNANCE AND COMMUNITY RESILIENCE:
ASSESSING THE IMPACT OF THE CACHE RIVER WETLANDS JOINT VENTURE
PARTNERSHIP ON COMMUNITIES IN THE CACHE RIVER WATERSHED OF
SOUTHERN ILLINOIS**

MAJOR PROFESSOR: Dr. Kofi Akamani

Resilience is a concept that is becoming heavily researched in the sustainability and resource management literature. For rural resource-dependent communities, community resilience is the ability to adapt to various drivers of change while maintaining or enhancing community well-being. In recent decades, the field of water resource governance has been transitioning from a reliance on command-and-control institutional structures toward adaptive multi-level institutions, such as adaptive co-management and adaptive governance. These transitions offer potential opportunities for enhancing the resilience and sustainability of resource-dependent communities. However, the relationship between these emerging governance approaches and community resilience is not fully understood. The Cache River Watershed in southern Illinois offers an opportunity for further exploring these relationships. Designated as a Ramsar Wetland of International Importance due to its concentration of high-quality wetland habitat and high biodiversity, the Cache River Watershed is home to over 100 threatened or endangered species. In 1991, the Cache River Wetlands Joint Venture Partnership (CRWJVP) was formed to address various ecological crises in the watershed. While the CRWJVP has made significant progress in restoring and reforesting the corridor along the Cache River, the impact of these management efforts on the resilience of communities in the watershed has not been adequately analyzed. Using the Cache River Watershed as a case study, the purpose of this study

was to assess the impacts of ongoing transitions in water governance on the resilience of resource-dependent communities. Based on a qualitative research approach, methods of data collection for this study consisted of key informant interviews, participant observation, and the review of documents. The interviews were recorded, transcribed, and analyzed using a deductive coding approach with the aid of NVivo software. The analysis of data on the general resilience attributes of the communities showed that the well-being and resilience of the communities were composed of multiple dimensions that could be represented by the capital assets framework. The results also indicated that the various dimensions of community resilience were dynamic rather than static, interacted with one another in complex ways, and were influenced by multiple drivers of change from the local to the global. The analysis of data on community participation in the governance of the watershed also revealed moderate to minimal levels of involvement. Barriers that were identified in the participation process comprised the lack of awareness and interest among some community members, as well as the lack of resources and opportunities for participation. Finally, the impacts of the CRWJVP management actions on community resilience were analyzed. Although most key informants reported positive impacts of the program on the communities' natural capital, the impacts of the program on other dimensions of community resilience, such as physical capital and economic capital were largely perceived as negative. Key informants recommended the need for a consensus-building approach to managing ongoing conflicts in the watershed, as well as a broadening of the CRWJVP management agenda to include social considerations, such as tourism promotion and flood control. These results highlight the complexity of resource-dependent communities and the urgent need for a transition toward adaptive water governance for enhancing social and ecological resilience.

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CHAPTER 1

INTRODUCTION AND METHODS

Introduction: Research Problem

The sustainable management of water resources has become a hot topic in recent years as human influences on ecosystems increasingly present challenges for water resource management. Drivers of change including increased human population, overconsumption of resources, and climate change have put many of the world's social-ecological systems under distress. Past and current approaches to water resource management are increasingly being scrutinized, as issues like water quality and quantity, as well as the fair and equitable distribution of water resources become more pertinent. Water resource management policies of the 20th century were based on the assumed ability of humans to control water resources and other relevant ecosystems. Policies based on this assumption were largely aimed at maximizing efficiency and output using top-down institutions. Yet, these command and control approaches to the governance of water resource systems are largely unable to effectively manage the complexities of social-ecological systems; neither can they effectively coordinate governance of trans-boundary, multi-jurisdictional water resources (Reisner, 1986; Holling & Meffe, 1996; Lemos & Agrawal, 2006; Chaffin et al., 2014). Additionally, these conventional approaches ignore two integral factors in the management of natural resources: the role of humans in ecosystems, and the need for flexibility and adaptation in water resource policies (Akamani, 2015; 2016). This has led to increased vulnerability in water resource systems in many parts of the world, including both developing and industrialized societies (Pahl-Wostl, 2009). In view of the shortfalls in conventional water management approaches, the need for alternative approaches to water resource management has been receiving attention among scientists and

policy-makers. In this regard, innovative management frameworks, such as adaptive management, co-management, adaptive-co management, and adaptive governance have all been proposed as mechanisms for promoting resilience and sustainability in water resource systems.

The resilience concept was first proposed by C.S. Holling as an ecological concept referring to a systems' ability to absorb disturbances and still maintain the same structure and function (Holling, 1973). The idea of resilience has since spread across various disciplines in the humanities and natural sciences as a framework for understanding and promoting sustainable development (Folke, 2006). For instance, the resilience concept has been applied in the study of sustainable communities, where the concept of community resilience is used to refer to the capacity of a community to adapt to change in order to maintain or enhance its well-being (Akamani, 2012; Berkes and Ross, 2013). However, with the exception of a few studies (e.g., Shinn, 2016), the implications of emerging water governance frameworks, such as adaptive co-management and adaptive governance on the resilience of rural resource-dependent communities have not received adequate attention in the water governance literature.

Relevance of Case

An excellent opportunity exists for analyzing transitions in water governance and their implications for community resilience using the Cache River Watershed in southern Illinois as a case study. The Cache River Watershed can be considered a hotspot of biological diversity, as well as a hotbed of socio-economic challenges. The Cache River and surrounding area is a >200,000-ha drainage basin located at the convergence of four physiographic regions in the southernmost tip of Illinois. The watershed is home to the northernmost high-quality cypress-tupelo wetlands in the US, and its high biodiversity is unlike any other natural area in the state of Illinois (Duram, Bathgate & Ray, 2004). Communities within the watershed are typically small

in population size. Out of the five counties in the watershed, two of them, Pulaski County and Alexander County, are among the most impoverished counties in the state of Illinois (U.S. Census Bureau, 2015). Figure 1 illustrates the entirety of the watershed, as well as the communities, waterways, and major highways within it.

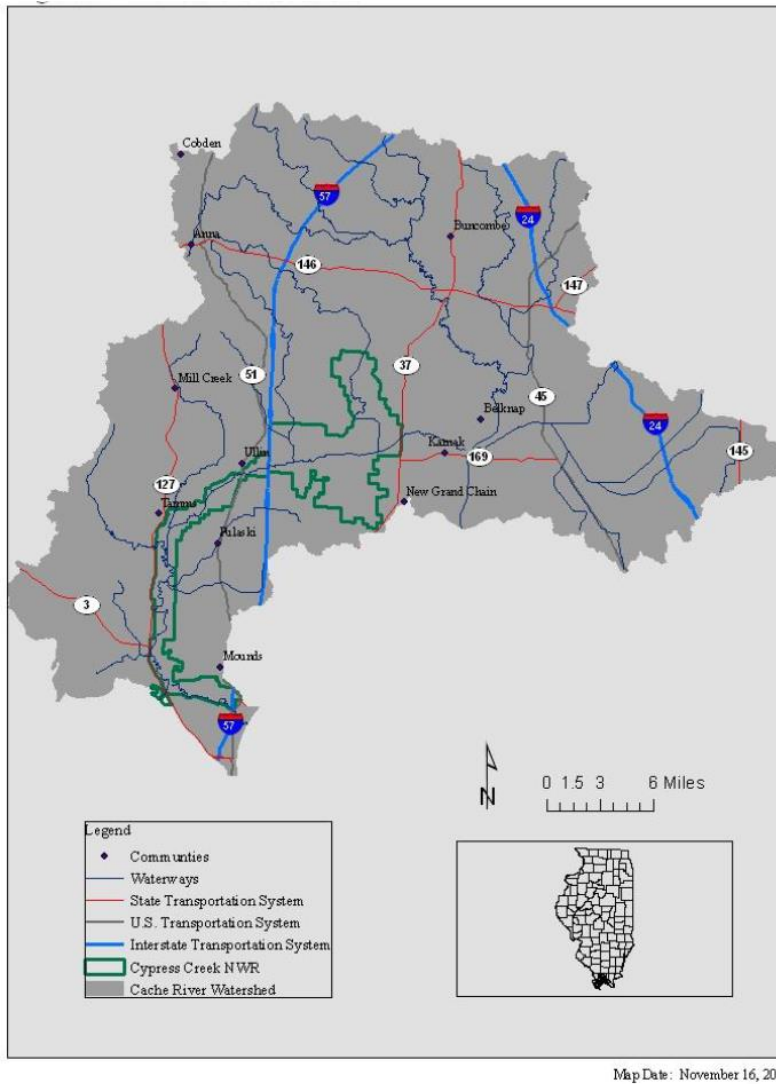


Figure 1: Map of the Cache River Watershed (Source: Cypress Creek National Wildlife Refuge)

Since the early 1800s when the area was first settled, several factors have resulted in the modification of the landscape from its natural state. Logging was the dominant industry in the Cache River Watershed during its early settlement. In 1915, the Post Creek cut-off was

constructed, which drained the Cache River directly into the Ohio River and divided it into two separate basins, known today as the Upper Cache River and the Lower Cache River. This in turn drained a large area of wetland and greatly reduced the flow of the Lower Cache River.

Following World War II, excessive logging activities in the watershed threatened to damage the remaining wetlands beyond repair. In addition, engineering projects such as dredging, channelization, and the construction of reservoirs have significantly altered the river from its pre-settlement state (Adams, et al., 2005; Akamani, 2014ab; Davenport, et al., 2010)

This accumulation of events sparked action from concerned local citizens. In the 1970s, a grassroots organization, the Citizens Committee to Save the Cache, began efforts to reduce unsustainable practices and to restore the wetlands in the watershed. In the early stages, the organization enlisted the help of both governmental and non-governmental organizations to provide the support needed to purchase land and implement restoration projects. Founding members of the Citizens Committee to Save the Cache and other private landowners collaborated on restoration projects from 1979 to 1982 and were initially successful in restoring habitat in an approximately 3.5 mile stretch of the Cache River. Recognizing the need for greater institutional support, the private landowners involved in the Citizens Committee to Save the Cache began to sell land to Illinois Department of Natural Resources (IDNR)¹ in 1983, under the agreement that the agency would halt the progress of drainage and clearing of wetland forest and would restore the riparian and wetland habitat (Citizens Committee to Save the Cache Representative, personal communication, March 2017; Corzine, 2009). In 1990, in response to the Emergency Wetlands Resource Act of 1986, Cypress Creek National Wildlife Refuge was established and managed by the United States Fish and Wildlife Service (USFWS) (United States Fish and Wildlife Service,

¹ At the time, known as Illinois Department of Conservation.

2015). A formal collaborative group, known as the Cache River Wetlands Joint Venture Partnership (CRWJVP), was subsequently formed to further advance the restoration efforts in the watershed. Currently, much of the land in the Cache River Watershed and corridor is owned by either USFWS or IDNR (Figure 2).

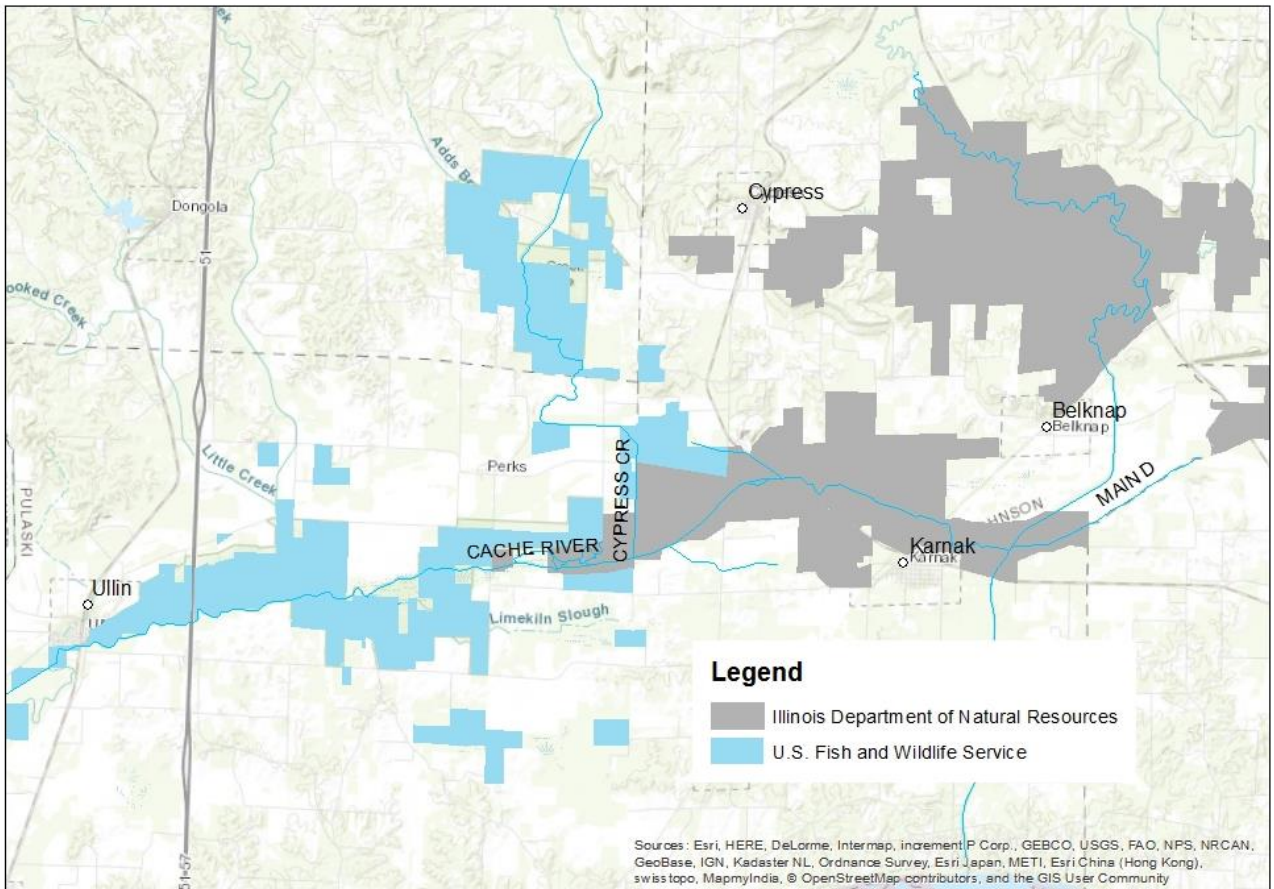


Figure 2: Map of current land ownership boundaries in the Cache River Watershed near the study communities of Karnak and Ullin (Source: Karen Mangan, Wildlife Biologist, Cypress Creek National Wildlife Refuge).

Formally established in 1991, the CRWJVP is a collaboration of multiple government agencies and non-governmental organizations whose focus is restoring the forest corridor along

the Cache River, as well as the wetlands in the watershed. Currently, the CRWJVP is comprised of the USFWS, IDNR, The Nature Conservancy (TNC), Natural Resources Conservation Service (NRCS), and Ducks Unlimited (DU). While not a member of the CRWJVP, a volunteer advocacy group, Friends of the Cache River Watershed, plays an active role in promoting and protecting the watershed. According to an IDNR publication,

The Joint Venture Partnership has a goal of protecting and restoring a 60,000-acre wetland corridor along 50 miles of the Cache River... To accomplish that goal, the Joint Venture Partnership has broken the task of restoring the system into three components: forest and wetland habitat restoration, reduction of sedimentation and streambank/bed erosion, and a managed reconnection of the Upper and Lower segments of the Cache River (IDNR, n.d.)

The transitions in water governance that have been occurring in the Cache River Watershed could enable or constrain opportunities for building the resilience of communities in the watershed. Results from studies that have been conducted in the watershed indicate that the CRWJVP has been faced with conflicts from local residents in the watershed who have called into question issues such as the transparency of the CRWJVP planning processes, land procurement methods, and other specific land management issues including drainage management and reforestation (Adams, et al., 2005; Davenport, et al., 2010). However, with the exception of a few studies (e.g., Akamani, 2013; 2014b), not much research has been done on the impacts of water governance on community resilience in the watershed. Moreover, existing resilience studies in the watershed were based on a review of the literature. As such, there is a need for empirical studies that offer in-depth insights into the resilience dynamics of

communities in the watershed and how they are influenced by the ongoing transitions in water governance mechanisms.

Research Purpose

The purpose of this qualitative study was to understand the resilience dynamics of rural communities in the Cache River Watershed and how they are influenced by the management programs of the CRWJVP. Specifically, the study sought to address the following research questions:

- a) What are current community conditions, and what changes have been occurring in community conditions since the emergence of the CRWJVP?
- b) To what extent have communities been involved in the management programs of the CRWJVP?
- c) How have the management activities of the CRWJVP impacted community resilience?

Research Approach and Paradigm

The study employed a qualitative research approach based on the constructivist paradigm. The research paradigms, or basic beliefs, of qualitative research often tend to be the opposite of those employed in quantitative research. Qualitative research moves away from the traditional positivist epistemology of science that assumes that objectivity is the key to discovering scientific truths. Positivism relies on empirical evidence and systematic, repeatable methods to produce replicable results, and subjectivity is seen as a barrier to knowledge generation (Sprague, 2005). This traditional view of science includes the idea that “science knowledge is unproblematic; science provides the right answers; truths in science are discovered by observing and experimenting; [and] choices between correct and incorrect interpretations of the world are based on commonsense responses to objective data” (Carr et al. 1994, p. 161). Criticisms of

purely quantitative approaches that rely on the positivist paradigm include using data and variables stripped from their context, the inability to assess human behavior through the meanings and purposes attached to it, the inability to uncover emic (insider) qualities of individual subjects and groups, the ambiguity of applying generalized data to individual cases, and the need to follow a rigid inquiry process that often ignores the source of the hypothesis (Guba & Lincoln, 1994).

Qualitative methods can address these shortfalls in a way that produces a fuller and richer understanding of socio-cultural phenomena. Although qualitative research can be executed from multiple paradigmatic perspectives, this qualitative study was based on a constructivist standpoint, which posits that those seeking knowledge, the knowledge itself, and the relationship between the two are socially constructed and shaped by “a specific matrix of physical location, history, culture, and interests” (Sprague, 2005, p. 41). Constructivism also assumes the existence of multiple realities that differ across individuals and groups. The knowledge generated from a qualitative study is not assumed to be simply there, awaiting discovery. Rather, knowledge is created through the interaction between the researcher and the subject or participant (Guba & Lincoln, 1994). Qualitative research often takes place in a setting that is familiar and natural to the participant, and allows the researcher to elicit more in-depth responses (Rossman & Rallis, 1998; Creswell, 2003). As the data is collected, the process evolves as the researcher learns which questions and processes produce the richest data. Because the qualitative research process is interpretive, the researcher must practice reflexivity in their interpretation. This entails the researcher acknowledging the influence of their values and interests on the lenses through which they interpret the data (Creswell, 2003). The use of a qualitative research approach is appropriate in this study, as it promises to provide a rich contextual account of the meanings community

members associate with ongoing transitions in community conditions and the role of the CRWJVP in these transition processes.

Sampling of Communities

Two communities in the Cache River Watershed were purposively selected for this study: Karnak and Ullin in the Pulaski County. These communities were selected because of their small population sizes that qualify them as rural communities, as well as their proximity to the Cache River corridor that increases the likelihood that community members would be aware of the CRWJVP management actions, such as ongoing restoration efforts along the corridor of the Cache River and their associated impacts. Karnak is located near the eastern portion of the Cache River Watershed. The community is situated approximately one mile from the Post Creek cut-off, and has a population of approximately 480 people (US Census Bureau, 2013). Ullin is located approximately 13 miles west of Karnak, and less than half a mile from the Cache River corridor. Ullin's population is approximately 443 (US Census Bureau, 2013). While both towns are predominantly agricultural communities with similar socio-demographic characteristics, a comparative case study on these two communities could potentially yield interesting insights due to potential differences in their exposure to various CRWJVP management efforts, such as flood management and reforestation.

Sampling of Key Informants

During the fieldwork, key informants were selected from multiple sectors in each community in order to ensure the representation of diverse perspectives in the data collection process. This included those involved in agriculture, education, local government, law enforcement, and social services. Religious organizations, and private sector representatives, including tourism and small business representatives were also interviewed. Additionally, key

informants representing members of the CRWJVP and other relevant organizations in the watershed were also interviewed. Initial contacts were made in the field through colleagues and acquaintances. Using these contacts, a snowball sampling approach was employed, whereby the researcher starts a referral chain in which the initial research participants are asked to refer the researcher to others who may fit the sampling criteria in a particular research context (Biernacki & Waldorf, 1981).

The criterion for determining the sampling size was the point of theoretical saturation when new themes cease to emerge from conducting more interviews (Guest et al., 2006). Using this criterion, 29 interviews were conducted with key informants representing the communities, CRWJVP members, and other relevant organizations and sectors in the watershed (Table 1).

Table 1. Number of interviews per sector represented.

Resident/Affiliate	Sector	# of interviews
Karnak (10)	Community Support Services	3
	Long-term Resident	3
	Small Business	1
	Small Business/Education	1
	Education	1
	Local Government	1
Ullin (11)	Community Support Services	2
	Local Government	2
	Agriculture	1
	Agriculture; Big Creek Drainage District	1
	Citizens Committee to Save the Cache	1
	Law Enforcement	1
	Law Enforcement; Education	1
	Long-term Resident	1
	Religious Organization	1
CRWJVP (3)	IDNR, USFWS, Outdoor Education (private sector)	3
Community/Non-CRWJVP Organizations (5)	Local Government	1
	Agriculture	1
	Community Support Services	3
TOTAL		29

Data Collection

The data for the study were generated via face-to-face individual interviews, document reviews and observation. The interviews were facilitated using an interview guide, with prompts to allow the researcher to guide the conversation toward revealing the major themes of the study. Two versions of the interview guide were used for the interviews: one for key informants representing the communities (Appendix A); and the other for the CRWJVP affiliates and related organizations (Appendix B). Prior to each interview, research participants were informed of their rights to withdraw at any time from the study. In addition, research participants were assured of the confidentiality of their responses (Appendix C and D). To create a more comfortable

environment, research participants were encouraged to choose the location where the interview would take place. Thus, the interviews occurred in a variety of locations, including village halls, churches, participants' homes or places of work, and other public settings such as in restaurants, and convenience stores. The wide array of interview locations also allowed me to observe community conditions and dynamics. All interviews were recorded with an electronic voice recorder. Handwritten notes were also taken during interviews.

In addition to the interviews, documents were reviewed from public records, such as planning documents, public announcements, and media releases (Creswell, 2003). This review covered ecological and hydrological assessment documents, CRWJVP management projects and accomplishments, pamphlets and other materials intended for public dissemination. Other documents, including booklets, editorials, and letters from concerned individuals regarding the Cache River Watershed were also reviewed. This review was conducted prior to and throughout the fieldwork. The purpose was to familiarize myself with the information that is readily available to the general public, gain a baseline understanding of the events that have occurred in recent history, have a sufficient understanding of common references made by interview participants, and determine whether claims made by key informants were consistent with existing records.

Observation occurred by attending public events held at the Barkhausen Wetlands Center. Observation was also conducted at various locations in the communities where social interactions among community members often occur, such as in village halls, restaurants, churches, and local gathering spots used by senior residents for coffee and conversation. The observation was conducted in an attempt to witness firsthand the attributes of the community in

terms of capital assets as the research participants described them. Field notes were taken during the observation sessions.

Data Analysis

A deductive coding approach was used to analyze the data. Consistent with this approach, I created a coding manual composed of categories generated from the community resilience literature (Appendix E). Following the transcribing process, I tested the coding manual by coding a handful of the interview transcripts and comparing the results with those of another researcher who also used the coding manual to code the same interview transcripts. The refined coding manual was then used in coding the rest of the data. The qualitative data analysis software, NVivo, was used in organizing and coding the data. Using the NVivo software, the data were initially coded under broad categories, such as community context, community participation, and CRWJVP impacts. Following this, the data were further coded into specific sub-categories. The use of multiple coders during the data analysis process was essential for enhancing the reliability of the results. Additionally, other members of the research team also served as peer debriefers in order to enhance the validity of the interpretation of the results. Moreover, the validity of data interpretation was further enhanced through the triangulation of different sources, i.e. interviews, observation and documents (Creswell, 2003).

CHAPTER 2

LITERATURE REVIEW

Neglect of Community in Command and Control Water Management

The governance of water resources has historically consisted of output-driven management goals and top-down decision-making by centralized institutions in systems that are assumed to be predictable and controllable. According to Holling and Meffe (1996), this “command and control” management approach is integrated into every part of modern society. However, accumulating evidence in the literature suggests that such management approaches lead to the loss of resilience (Holling & Meffe, 1996). For instance, Shinn (2016) describes how the implementation of strict regulations on floodplain resources in the Okavango Delta by the Government of Botswana led to the disruption of local livelihoods, thereby compromising long-term community adaptive capacity. Similarly, Tilt and Gerkey (2016) illustrate the adverse impacts of the construction of large dams on China’s Upper Mekong River by government-affiliated organizations on the social capital and resilience of displaced communities.

In view of the shortfalls of the command and control paradigm, alternative water governance systems that are flexible and open to learning and adaptability have been receiving attention among scientists and decision-makers (Holling and Meffe 1996; Akamani 2016). A strong argument can be made that emerging governance mechanisms, such as adaptive governance are more likely to be successful in promoting sustainable water resource management, as well as building community resilience. However, the relationships between adaptive governance and the resilience of resource-dependent communities have not received enough attention in the literature. This chapter reviews the literature on concepts relevant to the focus of this thesis on transitions toward adaptive water governance and its implications for

community resilience in the Cache River Watershed. In this regard, the next section of the chapter will provide a review on the concept of resilience in social-ecological systems, followed by a discussion on community resilience and its multiple dimensions. In subsequent sections of the chapter, the concept of adaptive water governance, its key features, and potential contributions to community resilience will also be explored. Concluding remarks will then be provided at the end of the chapter.

Resilience of Social-ecological Systems

Resilience is a concept rooted in ecology, but adapted for use in multiple areas of study, including psychology, risk and hazard management, anthropology, and other social science fields (Folke, 2006). The concept was first proposed by C.S. Holling to challenge the mainstream ecological theories of the time that posited that ecological systems existed in a single, steady-state equilibrium (Folke, 2006). Contrary to this assumption, Holling found evidence of the existence of multiple states of equilibria. Holling (1973, p. 14) defines resilience as “a measure of the ability of [a system] to absorb changes of state variables, driving variables, and parameters, and still persist.” Following this, Holling and Meffe (1996) made a distinction between two meanings of the resilience concept. The first one, which they referred to as equilibrium resilience, is based on the stability of ecosystems near a single equilibrium. From this perspective, resilience refers to the speed of return to equilibrium following a disturbance. Consistent with the command and control resource management paradigm, this definition of resilience emphasizes efficiency, constancy and predictability. Holling and Meffe (1996) provide a second definition of resilience which they consider as more useful for managing ecosystems over larger scales and longer periods of time. Known as ecosystem resilience, this type of resilience is based on the assumption of non-equilibrium conditions where there is the potential

for a system to flip from one stability domain to another. Resilience in this context refers to “the magnitude of disturbance that can be absorbed or accommodated before the system changes its structure by changing the variables and processes that control the system behavior” (Holling & Meffe, 1996, p. 330). This second definition of resilience underpins emerging resource management approaches, such as adaptive management and adaptive governance (Holling & Meffe, 1996; Folke, 2006).

Although the resilience concept was developed as an ecological concept, it has since been applied as a broader concept describing the dynamics of social-ecological systems in which humans and ecosystems interact with one another as coupled, interdependent, and coevolving systems (Berkes & Ross, 2013). From a social-ecological systems standpoint, Folke et al. (2010) make a distinction between adaptability and transformability. While adaptability describes the capacity to learn and respond to drivers of change while remaining within the same stability domain, transformability refers to the ability to create a fundamentally new system when conditions in the current social-ecological system become untenable.

Vulnerability is a concept related to resilience, but much of the vulnerability literature comes from theories rooted in risk and hazard management. This is not to say that vulnerability does not have a role in the resilience literature, but it is far more common to see vulnerability being studied under the lens of natural or anthropogenic disasters. Cutter et al. (2008) define vulnerability as a precursor to the severity with which humans experience hazards, as well as the ability to react to them. Essential elements for analyzing vulnerability impacts include multiple interacting disturbances, as well as the systems’ exposure, sensitivity, and resilience or adaptive capacity (Tuner et al., 2003). The concepts of vulnerability and resilience are closely related to one another, as a system’s vulnerability may be exacerbated by the lack of resilience (Adger et

al., 2005; Berkes, 2007). Common indicators of resilience may also be used to measure vulnerability. This thesis focuses on community resilience rather than vulnerability as an analytical perspective because resilience incorporates proactive planning, adaptive processes, and post-disturbance response, unlike the narrower focus on who or what can be harmed that is the focus of vulnerability research (Berkes, 2007; Cutter et al., 2008).

Community Resilience

Defining Features of Community Resilience

Resilience as an ecosystem concept is well studied and developed, but despite its growing popularity, the relevance of the concept for the study of communities and other levels of social organization has not been adequately explored. Berkes and Ross (2013) assert that the focus of resilience research has largely neglected the community level of analysis. Resource-dependent communities can be characterized as social-ecological systems because they are culturally connected to, and dependent on their local ecosystems (Lu, 2010, Berkes & Ross, 2013). The community concept has multiple sociological meanings, and the choice of definition has important implications for understanding community resilience (Akamani, 2012; Akamani et al., 2015). While some studies on community resilience have focused on place-based communities rather than those where members work and interact outside of their geographical area (Maida, 2007; Cox & Perry, 2011), other studies have adopted a non-territorial approach whereby communities can exist across different social fields and practices outside of specific geographic boundaries (Edmonson, 2003; Stephens, 2008). Overall, communities with deeply engrained economic, cultural, or historical ties to their natural surroundings provide opportunities for studying and furthering the understanding of community resilience (Maida, 2007; Berkes & Ross, 2013).

Magis (2010) defines community resilience as the “existence, development, and engagement of community resources by community members to thrive in an environment characterized by change, uncertainty, unpredictability, and surprise” (p. 410). Community resilience is a term that encompasses many contributing factors to the sustainability and well-being of a community. Based on the dimensions of social-ecological resilience discussed in previous sections of this chapter (Folke, 2006), community resilience may also refer to a community’s unique collective capacity to manage resources and adaptively respond to uncertainties, hardship, or unexpected demands on resources while maintaining its structure and identity (Wolfenden et al., 2007; Perry & Cox, 2011). Closely related to this concept is adaptive capacity which is a critical component of resilience in social-ecological systems, such as resource-dependent communities (Folke et al., 2005). As social-ecological systems, communities with high levels of adaptive capacity are not only able to withstand change, but also use it as an opportunity for development (Carpenter & Gunderson, 2001, Folke et al., 2005). However, some of the dimensions of social-ecological resilience, particularly transformability, have not received enough attention in the community resilience literature (Andrachuk & Armitage, 2015).

Assessing Community Resilience

One of the challenges in assessing community resilience is the identification of indicators that capture the dynamic and complex nature of social-ecological systems. One approach to assessing community resilience is to identify a community’s capital assets. Community capital assets serve as resources that determine the ability of communities to successfully respond to drivers of change (Flint, 2010; Magis, 2010). Communities with higher levels of capitals are assumed to have a greater ability to adapt to change (Akamani, 2012). As such, capital assets influence the resilience and vulnerability of communities. Capital assets also serve as measures

of the well-being of communities (Magis, 2010; Akamani, 2012). The use of capital assets as measures of community well-being is a response to the shortfalls in the traditional emphasis on economic measures, such as income and employment, as measures of well-being. The capital assets framework offers a more holistic and multi-dimensional approach to assessing community well-being that includes economic and non-economic measures (Donoghue & Sturtevant 2007; Magis, 2010; Akamani, 2012). The capital assets approach is widely used in several fields of study as a framework for assessing sustainability. For instance, the Asset-Based approach to Community Development (ABCD), developed by Green and Haines (2015) identifies capital assets as being imperative to community development. Similarly, Bennett et al. (2012) propose a capital assets framework for assessing the capacity for tourism development in indigenous communities. The authors examined community capacity using seven types of capital assets, comprising human, social, environmental, financial, physical, political, and cultural capitals. A key attribute of capital assets is that each type of capital asset can be traded for other types of capital assets within and across communities. As Ekins et al. (2003) have noted, “The essence of the concept of capital is that it is a stock that possesses the capacity of giving rise to flows of goods and/or services” (Ekins et al., 2003, p. 166). Ideally, the investment of capital assets should result in the accumulation of additional assets, thereby improving community well-being and enhancing community capacity to manage change. The remainder of this section will identify and discuss the various types of capital assets and their contributions to the resilience of communities.

Human Capital

Human capital is an intangible asset that comprises individual attributes, such as level of education, health, intelligence, emotional well-being, knowledge, and skills (Goodman, 2003).

Communities that have higher levels of human capital are more likely to be resilient because its members possess the traits needed to identify problems, find creative solutions, and effectively execute them in order to withstand disruptions and compete for opportunities (Magis 2010; Akamani 2012; Joseph & Krishnaswamy 2013). Individuals that have skills in planning, business, technology, leadership, networking, innovation, governance, communication, and media possess the tools necessary to withstand disturbances of all kinds, both natural and anthropogenic (Joseph & Krishnaswamy, 2013).

Natural Capital

Natural capital refers to the resources and ecosystem services derived from the natural world (Magis, 2010; Costanza, 1997; Goodman, 2003). Natural capital can include both resources that are used consumptively and those that are assigned intrinsic value (Goodman, 2003). These resources and the ecosystem services they produce can include raw materials, waste absorption, and the basic support of life. Additionally, environmental services provided by wilderness areas, refuges, parks, forests, and waterways all fall under natural capital.

Physical Capital

Physical capital refers to the various forms of infrastructure that constitute the built environment. These may include housing, education, health, transportation, and communication infrastructure (Ekins et al., 2003; Flint, 2010). A community's physical capital may be influenced not just by the availability of the infrastructure, but also the ability of community members to afford these services. In small rural communities, such as those in the Cache River Watershed, the small population size of communities can limit their ability to support a diverse range of physical infrastructure. Yet the absence of these facilities could also have adverse consequences on the development of other forms of capital, such as economic and human capital.

Economic Capital

Economic capital generally refers to the financial resources available for communities to employ in meeting various community needs (Magis, 2010). Economic capital includes money or other financial mechanisms, such as stocks and bonds, as well as the presence of lenders, borrowers, and other modes of economic exchange (Goodman, 2003). Economic capital interacts closely with the other types of capital assets by serving as an input in the production of other capitals (Goodman, 2003). Conversely, other types of capital, e.g. human capital, can be converted into economic capital when community members are able to invest their knowledge, education, and skills in ventures that generate economic returns. Similarly, natural capital could be used to generate economic capital through the production and use of raw materials, and the use of ecosystem services such as recreation and tourism. Just like the other forms of capitals, communities with higher levels of economic capital also have the means to increase their resilience.

Social Capital

According to Pretty (2003), social capital can be seen as a type of rapport built amongst community members. Building connections, relationships and cooperation between people “lowers the transactional costs of working together” and in turn increases the likelihood and confidence in the community and its ability to carry out collective ideas and actions (Pretty, 2003, p. 1913). Social capital is built from establishing social relationships and creating a network of peers and potential sources of collaboration; it is a source of resilience and a necessary means for social-ecological systems to adapt to change and withstand uncertainties (Folke et al., 2005). Other authors identify social capital as a function of networks of people among whom support for one another, trust, collaboration, reciprocity, cooperative behavior, and

collective action occurs (Joseph & Krishnaswamy, 2013; Wagner & Fernandez, 2008; Fukuyama, 2001; Portes, 2000). Social capital is arguably the most critical aspect of resilience in communities; individuals that interact closely with one another are more likely to establish strong connections with each other and built trust that leads to collective action.

Adaptive Water Governance

The need for adaptive governance stems from the failures associated with the command and control approach of past resource management. Adaptive governance is closely related to the concepts of adaptive management and adaptive-co management (Folke et al., 2005). In adaptive management, the resource management process proceeds as an experiment to test competing policy hypotheses (Folke et al., 2002). Adaptive management processes contribute to building resilience and reducing vulnerability in social-ecological systems by prioritizing learning, as well as maintaining the flexibility to integrate new knowledge into subsequent stages of the decision-making process (Allen & Gunderson, 2011). However, the implementation of such active forms of adaptive management is often criticized for failing to address social and institutional considerations in the resource management process (Akamani, 2016).

In adaptive co-management systems, resources are managed through flexible, context-specific community-based institutions, with additional support coming from a collaboration of multiple levels of governmental and non-governmental organizations (Folke et al., 2005). Adaptive co-management integrates the learning aspects of adaptive management with the multi-level linkages of co-management (Berkes, 2009). As such, adaptive co-management is often depicted as an extension of adaptive management into the social domain and a way to operationalize adaptive governance (Folke et al., 2005). However, both adaptive management and adaptive co-management are considered as useful frameworks when the focus is on adapting

to change while remaining within the current regime rather than facilitating transformational change (Olsson et al., 2014; Akamani, 2016).

Lee (2003) defines governance as “changes in the role, structure and operation process of the government, or the way social problems should be resolved” (p. 3) Thus, governance is a broader concept that goes beyond the role of government to encompass the structures and processes shaping interactions between government representatives and non-state actors in decision-making and implementation on societal problems. Adaptive governance entails the pursuit of multiple objectives that reflect the conflicting interests of a diverse network of stakeholders, as well as the uncertainties that characterize management of dynamic ecosystems (Dietz et al., 2003; Folke et al., 2005). Adaptive governance systems rely on multi-level institutional mechanisms to connect actors in managing complex ecosystems across multiple spatial and temporal scales (Akamani & Wilson, 2011). As such, adaptive governance involves the use of polycentric institutions, which comprise different types of organizations at multiple levels with some degree of autonomy in decision-making at each level (Folke et al., 2005; Lee, 2003; Ostrom, 1996; McGinnis, 2000). In short, polycentric governance systems refer to governance systems that have multiple centers of decision-making authority at various scales (Ostrom, 2010). By relying on polycentric institutional arrangements, adaptive governance addresses the problem of scale mismatch through the allocation of decision-making authority at appropriate scales (Akamani & Wilson, 2011). Besides the use of polycentric institutional mechanisms, adaptive governance also entails the promotion of social learning and knowledge integration, recognition of uncertainty and the need for experimentation, management of conflicts through participatory processes, and integration of social and ecological goals in land

and water resource management at the bioregional scale (Folke et al., 2005; Olsson et al., 2006; Huitema et al., 2009; Österblom & Folke, 2013; Akamani, 2016; Akamani et al., 2016).

In view of the key features discussed above, adaptive governance appears to be a promising approach for promoting the health of aquatic ecosystems and the resilience of resource-dependent communities through ecosystem-based management approaches. The effective implementation of adaptive governance and adaptive co-management processes could potentially contribute to building the capital assets and local institutions that influence community resilience (Akamani, 2014a; Plummer, 2013). However, the implementation of such innovative governance mechanisms is more likely to succeed where communities have the requisite capital assets and institutions to effectively participate. Without the cooperation and support from many local and non-local actors, as well as the resources to produce the desired results, adaptive governance cannot be effective. Thus, adaptive governance and community resilience seem to have reciprocal relationships. These complex relationships between community resilience and adaptive water governance deserve further theoretical and empirical exploration.

Adaptive Water Governance and Community Resilience

Previous sections of this chapter have argued that transitions in water governance from the command and control paradigm toward adaptive governance could potentially contribute to building the resilience of communities and ecosystems. This section further elaborates on this argument by examining the potential contributions of adaptive governance to the various capital assets that shape community resilience. Relevant case studies from the existing literature are used as illustrative examples whenever suitable.

Social Capital

Adaptive governance entails the use of participatory decision-making processes, as well as the devolution of decision-making authorities to state and non-state actors at appropriate levels (Folke et al., 2005; Huitema et al., 2009). Opportunities for vertical and horizontal interactions among the network of actors within this polycentric structure could promote the accumulation of social capital through collaboration, trust building, information exchange, and progress toward common goals (Folke et al., 2005; Cole, 2015). For instance, Olsson et al. (2004) describe the emergence of collective action at the local and international levels to address the declining population of crayfish in the Lake Racken area of western Sweden. The process started with the recognition of the problem of increasing acidification by a key individual, leading to the formation of a local liming group. This group subsequently evolved into the Lake Racken Fishing Association to benefit from new government policies. These local conservation initiatives expanded to involve scientists, politicians and the Swedish Environmental Protection Agency at the national level, as well as international cooperation with representatives from Norway in the conservation of crayfish.

Human Capital

Adaptive governance could also create opportunities for the enhancement of human capital in resource-dependent communities through the integration of diverse sources of knowledge. For instance, in the case study on the conservation of crayfish in the Lake Racken area, Olsson et al. (2004) found that the networks established through multi-level collaboration provided a platform for social learning through the exchange of knowledge and information, including the harnessing of local knowledge. Adaptive governance also provides an opportunity to enhance current leadership and to create new leadership roles, thereby increasing the learning potential of multiple individuals (Mukhopadhyay, Nepal, & Shyamsundar, 2014). Leach and

Pelkey (2001) found that effective leadership was the second most important indicator of success in watershed partnerships.

Economic Capital

Adaptive governance is often posited as an appropriate institutional mechanism for pursuing ecosystem-based resource management (Folke et al, 2005). As such, adaptive governance embraces the pursuit of integrated goals that address social, economic and ecological concerns (Folke et al., 2011; Akamani, 2016). The use of participatory processes that involve local communities could enhance opportunities for realizing the livelihoods and economic capital outcomes of adaptive governance. For instance, a study on the tourism-dependent economy of Dauphin Island, Alabama, found that local participation and multi-agency cooperation fostered a successful recovery after the community suffered from economically devastating hurricanes. The city council collaborated with a consulting service to create a long-term economic and redevelopment plan to ensure more sustainable livelihoods for its permanent residents. Stakeholder engagement and participatory planning was employed to promote knowledge amongst the community, design a community-based approach to decision making, and to create a comprehensive plan to encourage best-practice planning (Flint, 2010).

Natural Capital

Adaptive governance is ultimately about building resilience in coupled social-ecological systems by maintaining the integrity of ecosystems and their capacity to provide the goods and services upon which humans depend (Folke et al., 2005). The case study of the Southern Ocean illustrates the importance of networks, actors, organizations, and institutions in achieving desired ecological outcomes in adaptive governance processes (Österblom & Folke, 2013). The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) was

established in response to stock collapses caused by illegal, unreported, or unregulated (IUU) fishing practices in the Southern Ocean. The process consisted of informal actors utilizing networks for information exchange and collaboration, which transformed into formal organizations that engaged more actors at many levels for monitoring and enforcing regulation. These efforts led to a drastic reduction in IUU fishing. This improved the natural capital by restoring habitat and allowing for a profitable and well-regulated fishery. Similarly, other case studies (e.g., Olsson, Folke & Hahn, 2004; Olsson, Folke & Hughes, 2008; Schultz et al., 2015) demonstrate that collaboration and mobilization among actors, bridging organizations, and multi-level support enhance success in the management of environmental problems.

Physical Capital

The empirical studies on adaptive governance that have been published tend to overlook the development of physical capital as an outcome of adaptive governance. However, it could reasonably be argued based on the demonstrated contributions of adaptive governance to the other types of capital that it could also enhance physical capital. Given that capital assets are transformable and routinely traded for other types of capital (Ekins et al., 2003), the development of economic capital and human capital, for instance, should enhance the capacity of communities to maintain essential community infrastructure. There are also opportunities for communities to benefit directly from the provision of infrastructure by external organizations as part of the integrated development and conservation approaches pursued in adaptive governance regimes.

Concluding Remarks

In recent decades, the concept of community resilience, i.e. the ability of communities to adapt to drivers of change while maintaining or enhancing their well-being, has been receiving attention in the literature. Community resilience is generally shaped by community access to

various capital assets, as well as the availability of effective institutions for the mobilization of these assets. Community resilience is also shaped by external factors, such as the implementation of conservation policies. The design and implementation of conservation policies, such as those on water resource governance, may either erode or contribute to building community resilience. However, the relationship between evolving water governance mechanisms and the resilience of rural communities remain largely unexplored. In this chapter, the shortfalls of the conventional command and control paradigm of water resource management have been highlighted with a specific emphasis on the adverse impacts on rural resource-dependent communities. As an alternative, the chapter has argued for the implementation of adaptive water governance as a more promising approach to the sustainable management of water resources that also contributes to community resilience. Through the comparative analysis of two communities in the Cache River Watershed, this study seeks to build knowledge on how transitions toward adaptive water governance may create opportunities for the improvement of the resilience of communities in the watershed. Findings from the study should contribute to enriching current understandings on the relationship between community resilience and adaptive water governance.

CHAPTER 3

RESULTS ON KARNAK

The results presented in this chapter are based on data that were generated through individual interviews with key informants representing various sectors of the local society in the community of Karnak and supported with data from observation and the review of documents. Based on an analysis of the data, the following categories were used to organize the results: the current setting and context of the community; the resilience dynamics of the community; community participation in the Cache River Wetlands Joint Venture Partnership (CRWJVP) programs; and outcomes of the CRWJVP programs.

Community Profile

Karnak is a small community located in Pulaski County in southern Illinois. Although the community has a population of less than 500 people (U.S. Census Bureau, 2017), it is one of the most populous communities in the Cache River Watershed. The community is situated just 4.5 miles north of the Ohio River. According to the US Census Bureau, twenty-five percent of the population is aged 62 or older, compared to a national average of sixteen percent. In addition, twenty percent of the population lives below the poverty level (U.S. Census Bureau, 2015). Karnak hosts a grocery store and a restaurant, as well as a couple of auto repair shops, a funeral home, and several churches, but access to many goods and services comes from the micropolitan² area of Paducah, Kentucky, which is located 30 miles to the southeast of Karnak. Bordering the community on the north, west, and east is the Cache River State Natural Area,

² “Micropolitan” is a term becoming more commonly used to describe areas that do not accurately fit into the urban, suburban, or rural categories. According to Vias (2012), “Micropolitan areas, sometimes called mini-metros, occupy a unique position in the US urban hierarchy between low-density rural areas and high-density metropolitan areas. These county-based units—only recently recognized by the Office of Management and Budget—have urban centers whose populations range between 10,000 and 50,000. “

owned and managed by the Illinois Department of Natural Resources (IDNR).

Community Setting and Context

This section provides a description of the current conditions of the community of Karnak, as well as changes that have been occurring in the community in recent decades as perceived by key informants. During the interviews, each research participant was asked a series of questions designed to reveal the positive and negative attributes of the community in terms of current conditions and patterns of change. Consistent with the theoretical approach employed in this study, the results are presented using various types of capital assets as analytical categories. The section presents the findings on the negative and positive perceptions expressed by key informants on the various dimensions of well-being in the Karnak community using social capital, human capital, economic capital, physical capital, and natural capital.

Social Capital

For the purposes of this study, social capital refers to the network of social relationships and connections that promote cooperative behavior within and among communities. Key informants identified several positive aspects of the Karnak community that relate to social capital: cooperation; leadership; solidarity; and overall familiarity and affability towards fellow community members. However, some of the negative perceptions about the community were also related to social capital: inadequacy of opportunities for engaging the youth; lack of trust between the community and external governmental structures; and rising incidence of deviant social behaviors, such as the use of illicit drugs among newcomers.

During the interviews, one of the most frequently mentioned positive attributes of Karnak relating to social capital was cooperation among community members. Key informants either identified specific instances where cooperation occurred within the community or made more

general statements pertaining to cooperation, such as working together, and helping one's neighbors. The incidence of cooperation reflects the mutual interests of community members. The small geographical area of the community plays a role in this, as any events or occurrences within this small geographical area tend to affect a large proportion of the community. The small size of the community also provides opportunities for repeated face-to-face interactions that contribute to trust and cooperation. This cooperative spirit among community members appeared to play a key role in community collective action aimed at benefitting from opportunities, and also mediating the adverse effects of various drivers of change.

“It's small, everybody knows just about everybody, everybody kind of works together to get things done... We've got committees working together now, trying to figure out how we might be able to bring people in; different activities that the town people have tried to develop in order to bring people in that might be interested in coming here.” (Karnak, Local Government Representative)

“From looking back at during the ice storm and other times of that flooding, and the help up there that the volunteers that showed up for sandbagging, I really noticed a sense of cohesiveness, how they all pulled together. So I think they would be resilient in times like that, really... A lot of organization and volunteering and when it was needed, when it's really push comes to shove, they jumped in there and did it ...” (Karnak, Community Services Representative)

Key informants also identified effective community leadership as a positive attribute of the community. The interviews revealed that local leaders have implemented measures aimed at expanding business and economic opportunities in the community. During the fieldwork, I observed the high level of motivation amongst community leaders as they prepared to take

advantage of the influx of people visiting the southern Illinois region during the solar eclipse event that took place in 2017.

“I think they've [community leaders have] already made good inroads; they've had a couple events already ... planning an event for the 2017 eclipse. So, I think they're being proactive when it comes to those types of things. There is a car show this summer, so I think they are doing some things to capitalize on the tourism aspect.” (Karnak, Small Business/Education Representative)

“Well, they've [community leaders have] been working, getting things changed around here. They got the camping area [Main Brothers Campground], that's something new. And they're trying to do things but it's just going to take time and money...” (Karnak, Long-term resident)

In addition to these efforts, other key informants mentioned various leadership roles played by governmental and non-governmental organizations in community responses to various environmental risks, such as floods and fires.

“Fortunately, we had enough foresight at our church to build a fellowship hall that we were able to use to be able to put people into. So we have facilities now that people can go to. There's backup generators and things that we can use in case something bad like that happens.” (Karnak, Education Representative)

“We have a good mayor, a good board, and volunteer fire department, and first responders, and I think they all do a good job.” (Karnak, Community Services Representative)

During the interviews, community solidarity also emerged as one of the defining traits of the community of Karnak. Given the relative geographic isolation of the community, key

informants expressed pride in the self-reliance of community members, and their ability to do so through local bonds of solidarity.

“I think everybody's very willing to help their neighbor do what they have to do in the event that it's needed.” (Karnak, Small Business/Education Representative)

“It's a good little town. If you need help... most of the time, you know who your neighbor is. Most of the time you even know the neighbors across town”. (Karnak, Long-term resident)

Another characteristic that reflects social capital in Karnak is the overall sociability among community members. Key informants described Karnak as a close-knit community in which residents are friendly with one another and frequently socialize with one another in informal settings. These interactions further strengthen the mutual interests among community members.

“Most of the time [Karnak is] very cordial... And I can tell you in the summer when we have ball games, my front porch and my yard is full, because see, the ballpark is right out here. And they'll come. They'll put their lawn chairs and sit in the front yard. So we have a good ole' visit sometimes and watch the game. It's a fun time in the summer.” (Karnak, Long-term resident)

In spite of the many positive attributes relating to social capital in Karnak, key informants also mentioned some negative aspects. For instance, concern was expressed over the inadequacy of opportunities for social interaction among the youth in the community.

“Well, we need something for kids to do. There's nothing. We don't have no scouts, or 4-H, or anything. There's nothing for them to do ... They had that real nice ball field down there. And I think they only had t-ball last year. And I remember when it used to be every

night, there was ball.” (Karnak, Community Services Representative)

Another limitation in the community’s social capital that emerged from the interviews is the distrust in governmental institutions, which weakens the link between the community and relevant external actors. This weak connection with external organizations could potentially deny community members of opportunities for improved well-being.

“Right now there's a lot of distrust in all kinds of government. So you've got to inform the people in a way that they know that they're getting informed with the truth,” (Karnak, Local Government Representative)

Additionally, some key informants mentioned the growing incidence of illicit drug use as a negative attribute of the community. Key informants speculated that the geographic isolation of the community might be attracting new residents who are more inclined to engage in illegal activities. In addition, other key informants seemed generally concerned about the increasing proportion of unfamiliar faces in the community.

“Not exactly transient people, but different people moving here. For what reason, I don't know, because there isn't any industry here anymore. I don't know what would draw them. Drugs are more prevalent.” (Karnak, Long-term resident)

“I've noticed a lot of younger people coming in, a lot of rougher community. Since one side's a wooded area, there's been a lot of problems with people making meth in the woods and things.” (Karnak, Education Representative)

“Karnak is a small community. Everybody used to kind of know everybody. Now I see faces up and down the street that I don't know as much as I used to. But I think it's a good place to live since I've been here for so long.” (Karnak, Community Services Representative)

In all, key informants seemed to view Karnak as a “tight-knit” community in which bonds of solidarity and cooperative behavior prevail. However, it appears these characteristics describe relationships among long-time residents rather than newcomers. Thus, there is a perception among respondents that the conduct of newcomers may not always conform to the social norms and mores that have guided social interactions in the community in the past.

Human Capital

Human capital encompasses the attributes that shape the ability of community members to make informed decisions and to execute them in order to improve upon community well-being. Human capital indicators may include the presence of individual or collective education, health, intelligence, knowledge, skills, and labor availability. The interviews revealed that key informants’ perceptions on community attributes relating to human capital were largely negative. Responses covered population decline, the aging of the existing population, and the arrival of newcomers with unfavorable attitudes towards community development that differ from that of long-time residents.

An issue of major concern to key informants that emerged during the interviews is the decline in the community’s population over the years as a result of the complex interaction among a multitude of factors. The limited employment opportunities in the community were mentioned as a key factor that has reduced the ability of the community to attract a younger population and contributed to out-migration in the community. As the community’s population has continued to decline,³ the smaller population size creates a more difficult environment for sustaining local business. Without the businesses needed to provide basic goods and services, the

³ Karnak’s population at the 1990 census was 580, and at the 2000 census, 617, compared to an estimated 456 in the year 2016. The largest population recorded for Karnak was 893, at the 1940 census. (US Census Bureau, 1940, 1990, 2000, 2010, 2017)

incentive for residents to continue living in the community decreases.

“Throughout my years here, the population has gone down since our census. I think even more so it's Small Town, USA. And so many people have left here after high school... for more work opportunities and things.” (Karnak, Community Services Representative)

“Now, mostly, people here in town are retirees. They're mostly retirees, but there's nothing here for a young person to do. And you can't live without an income...” (Karnak, Long-term resident)

Owing to its limited ability to attract a younger population, most key informants viewed Karnak as a community that is largely composed of an older population. The aging of the community's population could have adverse implications for the supply of labor, participation in civic activities, and the overall vitality of the community.

“Karnak is a small community with a lot of older people, and fewer younger people moving in there. The ones that are there that are over the age of 40 have been there for a long time. We have some that have been lifelong people because they live there and worked there at the old box factory that used to be there. So basically, it's just a village, not really set up as a township. So it's an older place, an older community.” (Karnak, Education Representative)

Key informants also expressed the view that that unlike the older generation of long-time residents, newcomers and some members of the current population do not possess the work ethic, spirit of civic engagement and other dispositions needed to promote community development.

“This is a different breed of people that's moving in now. They don't have any roots here. They don't know what it used to be like or anything ... I hate to say this but they're on aid [federal benefits]. They grew up on aid, they don't know to work like we did” (Karnak,

Long-term resident)

Economic Capital

Economic capital can be generated through business transactions, taxes, and other exchanges of money, and can be manifested in the form of physical property and land ownership, the presence of business ventures, and the overall amount of economic activity occurring in a given place that influence prospects for income and employment. Key informants' responses revealed some positive perceptions on economic conditions in Karnak with regard to the existence of local businesses and the implementation of new economic development projects. However, negative perceptions were more commonly expressed by key informants on the declining employment opportunities, the limited ability of the community to attract businesses, and the impacts of these declining economic conditions on local tax revenue and livelihood options.

One of the positive economic attributes of the Karnak community that emerged during the interviews is the existence of locally-owned business ventures in the community that serve as sources of employment. The existence of these small businesses demonstrates the availability of entrepreneurial skills in the community. Existing businesses that were identified during the interviews include a restaurant, a grocery store, and a couple of auto repair shops.

“We still have a grocery store. We have a restaurant. We have a body shop. There are things there that bring people into the town. But all in all, there has been decline.”

(Karnak, Small Business/Education Representative)

“We only have one business and that's the store, which is a restaurant store.... We have Shawnee Development [Shawnee Development Council], and that seems to do all right.”

(Karnak, Long-term resident)

Besides these local businesses, the community also has a limited number of formal establishments, such as the MAP (Massac-Alexander-Pulaski) Training Center, which provides vocational training and habilitation services to improve functioning and skills for daily living of developmentally challenged individuals. Also present in the community is Shawnee Development Council which was described by its coordinator as a “community action agency” that serves the seven southernmost counties in Illinois, (Alexander, Hardin, Johnson, Massac, Pope, Pulaski, and Union counties), with a mission “to enable individuals, families, and communities to determine their needs and obtain the resources required to accomplish their goals of self-sufficiency and a better quality of life.” (Shawnee Development Council, n.d.) Although the agency has at least one office in each county, the main administrative office is located in Karnak. The programs administered by Shawnee Development Council are diverse, but generally include a food pantry, loan program, grant program, emergency assistance for housing, utilities, etc., homelessness prevention, home weatherization assistance, senior citizen companionship programs, community volunteer coordination, scholarships, employment and training assistance, and provision of NOAA weather radios. Because of increased levels of unemployment and poverty in the southernmost part of the state, Shawnee Development Council’s presence and services are vital to the health of the community.

In addition to the existing businesses, key informants also mentioned new development projects, such as the construction of a new campground, the Main Brothers Campground, as a positive economic attribute of the community. The construction of the campground was seen as part of efforts by the community to promote economic development through nature-based tourism.

“Well, there's a lot of contention right now over putting in a campground, but I think

that's a good thing. People need recreation, and even people here, where the recreation is at, need recreation. That's not really going to do the residents very much good to have the new campground come in, but it's going to bring money into the community. People are going to come in, they're going to camp, they're going to go to our store, they're going to eat at our restaurants, they're going to stay in our area. That's been good.”

(Karnak, Education Representative)

In spite of the positive economic attributes discussed above, key informants also highlighted major economic challenges facing the community. A major problem that received a lot of attention among key informants is the loss of non-farm jobs due to the collapse or relocation of business and industrial enterprises in the community. The most commonly cited case was the closing of the Main Brothers Box and Lumber Company, which was the main source of industrial economic activity in the community during the mid-20th century. After changing ownership (becoming Martin Brothers), the factory ceased operations in the 1980s. Changes in shipping standards—from wooden crates to cardboard boxes—was mentioned by key informants as the reason behind the company’s collapse. The closure of the factory, as well as other local businesses has led to a decline in employment opportunities in the community.

“We had the factory and the sawmill and they hired. In fact, they had three shifts: they had a night shift; they had afternoon; day and night. And anybody that wanted a job, had a job. And that was good for the town ... When Main Brothers quit their box and lumber factory here, that was the business here. That is what started Karnak. And when they had left, I understand Martin Brothers took it over, but I wasn't here at the time. And it did all right for a while, but now it's gone. And that was the beginning of the decline of Karnak.”

(Karnak, Long-term resident)

“Well at one time, this place had two car lots, four gas stations, a movie theatre, roller skate area, all those were here at one time and they're no longer here. Now we've got one grocery store and no gas stations, everything's gone. Railroad...basically a railroad town. Also, Main Brothers here had a box factory, and they created 250-some jobs. And when they closed out, 250 some jobs and families departed.” (Karnak, Local Government Representative)

Some key informants attributed the limited ability of the community to attract and retain viable businesses to the small population size of the community, as well as the low income levels of community residents that limit their purchasing power. The responses indicated that the low demand for goods and services in the community is also influenced by the finding that residents of Karnak have become accustomed to driving to larger settlements to purchase goods and services that are often not available in the community.

“There's still a lot of bad things because we're in an economically depressed area. We've only got one store. We did have two restaurants now we only have the one because it's hard to maintain that in town. There, there's just not a lot of people.” (Karnak, Education Representative)

“I think if another business would come in, because at one time they talked about one of the Dollar stores might come in here. I don't think, personally, I don't think it would work because I think that people are geared to get in their car and go somewhere, which we have always done. I don't think it would flourish, I just don't.” (Karnak, Long-term resident)

“I know a couple of years ago, some of the board members, they had tried to get a Family Dollar in here... It sounded helpful for a while. I think that kind of fell by the

wayside and you know... And then I know they've attempted to get a Casey's in here, you know, and some of those things. I don't know if that's a little too grandiose for us to think of here in Karnak, but I would love to see something like that come in, if at all possible. It's risky. We had a restaurant uptown that... They didn't stay in business, maybe, seems like to me maybe about a year, that's approximate, and it also just couldn't make it. And I'm sure it couldn't, just on Karnak, you would need more business from the surrounding areas and things to make it. Just on Karnak's, so many limited incomes and things here as I said, retired, or in the lower income category, so that's kind of difficult to come in here with a business. I think it'd be a struggle.” (Karnak, Community Services Representative)

Key informants also highlighted other negative economic consequences stemming from the collapse of businesses and loss of jobs in the community. Of particular concern was the long distances local residents in the working-age group have to commute for employment opportunities. Other responses also pointed to out-migration as another consequence of the declining employment opportunities in the community.

“I'd like to have more industry, but it'll never happen because of the times... You have to go away to make a living. We had that; now, it's mainly indigent people or retired people, like me... there's nothing here... We did have the SMART transportation but it is now headquartered in Vienna... We don't have anything here, not like we used to years ago.” (Karnak, Long-term resident)

“I know the kids, the young people that live around here, that grow up around here, they have to go to as far as Metropolis [a much larger community] at least... Most teenagers and young people want a little job of some kind, and things like that, and we don't have a

lot of that for them.” (Karnak, Small Business Representative)

Most participants were highly skeptical of the community’s potential for economic development, both now and in the future. Although there are efforts underway to boost their economy, the general perception is that the benefits of these efforts (such as increasing tourism, attracting business, etc.) will be short-lived. The challenges facing the community regarding human capital, especially population size and stability, are closely tied to the challenges in creating economic opportunities in the community. Participants were cautiously optimistic, however, that the activity and changes coming to the natural resources, namely the Cache River and wetlands, would be an opportunity to improve their economic standing.

Natural Capital

Natural capital refers to the stock of natural resources from which communities derive a range of ecosystem services, as well as the mechanisms influencing access to these resources. The analysis of the interview data revealed that key informants considered benefits derived from the ecosystems in the watershed as a positive attribute of the community. These benefits include opportunities for recreation and tourism, as well as the ability to secure food from hunting and fishing. On the other hand, key informants also noted that community members may be lacking an appreciation of the full value of the natural capital the community possesses.

Most key informants perceived the Cache River and the larger ecosystem as a healthy ecosystem that provides diverse opportunities for recreation and tourism. These opportunities are utilized by local residents in the watershed, as well as tourists from distant geographic regions.

“The one thing that we do have going for us is that there's woods. And we've got the bike trail [Tunnel Hill State Trail] that we try to make a lot of local impact with...Then of course, now we have the campground [Main Brothers Campground] going in. So we are

trying to take advantage of the woods and the nature that we have around here in the area that a lot of people don't get to see..." (Karnak, Education Representative)

"Well, we've got the bike trail, we've got the wetlands, we've got bird watchers coming down in this area because there's different types of birds and stuff." (Karnak, Local Government Representative)

"Well, I think it's [the Cache River is] a tourism attraction. I think it brings people into the communities that most likely would not have come here ... (Karnak, Small Business/Education Representative)

Another positive attribute of Karnak that was mentioned during the interviews is access to fish and wildlife in the watershed for subsistence purposes. Though the Cache River may not be widely utilized as a source of food for families, opportunities for hunting and fishing could enhance access to an affordable food supply beyond what the local grocery stores can offer in rural communities, such as Karnak.

"Well, my husband is a hunter. He really enjoys that the wildlife is protected. That it has brought about more things, more types of animals that we enjoy." (Karnak, Community Services Representative)

"But there are a lot of people that have boats and they like to fish... Well, the Cache offers fishing. It offers a way for people to be able to feed themselves... families need the food that's generated from a wildlife area like this." (Karnak, Education Representative)

However, the interviews also revealed that not all residents of the community may be fully aware and appreciative of the community's natural capital. One key informant suggested that unlike non-residents who hold the ecosystem in the watershed in high regard, local residents may have taken things for granted. This lack of appreciation of the community's natural capital

could have adverse implications for the ability of the community to benefit from existing opportunities.

“I do serve on the Southernmost Illinois Tourism [Bureau], so I'm well aware of what's available in the area, well aware of what the Cache brings. Those of us that grew up around in this area don't appreciate the Cache like people coming in from the outside. I mean, that's just a reality and I think that's anywhere. You don't appreciate what you have at home. You look out to travel across the states, or wherever, to go visit. But I do see the significance of the tourism aspect of what the community is doing.” (Karnak, Small Business/Education Representative)

Physical Capital

Physical capital encompasses various components of the built environment, including water supply systems, roads and other transportation and communication networks, as well as social infrastructure, such as hospitals, schools, and housing. During the interviews, key informants expressed positive perceptions about Karnak's infrastructure for tourism development, disaster preparedness, and education. Nonetheless, some key informants also expressed dissatisfaction with the community's housing and water supply system, the general decline in service providers in the community, and the relative isolation of the community from major service centers.

Almost all key informants mentioned the development of infrastructure for tourism promotion as a positive attribute of the community. While some were impressed with recent efforts to improve upon the aesthetics of the community, it was the construction of the Main Brothers Campground that received the most attention. The campground is located at the trailhead of the Tunnel Hill State Trail, where the Main Brothers Box and Lumber Company

once stood. Among the facilities at the campground are restrooms, tent camping sites, electricity hookups, and fire pits, as well as an informational board detailing the history of the site. Key informants expressed optimism about the potential contributions of the campground to the community's development.

“Our mayor is recently really working hard on cleanup from where the old box factory and the sawmill [Main Brothers Box and Lumber Company] was, and it really looks nice with what all they've done.” (Karnak, Community Services Representative)

“I think some of the activities that the town has undertaken, as far as putting in a campground and trying to attract people to the bike trail and the Cache River wetlands area is a very positive move in the right direction. So, all in all, I'm satisfied.” (Karnak, Small Business/ Education Representative)

Some key informants also focused on the community's infrastructure for disaster management as a positive attribute of the community. Given the vulnerability of the community to floods and other environmental threats, the availability of infrastructure for mitigating the impacts of such threats is essential for maintaining community well-being.

“Fortunately, we had enough foresight at our church to build a fellowship hall that we were able to use to be able to put people into. So we have facilities now that people can go to. There's backup generators and things that we can use in case something bad like that happens.” (Karnak, Education Representative)

Other key informants expressed positive perceptions about Karnak's educational infrastructure. Key informants highlighted the contributions of the Shawnee Community College toward enhancing access to higher education among residents of the community. Since the establishment of the college in 1969, residents of Karnak and other communities in the region

have had the opportunity to enroll in traditional college classes, including classes on technical skills. Beyond the contributions of the Shawnee Community College, it was also clear that key informants were generally satisfied with the overall quality of the community's educational system as a whole.

"I can remember when Shawnee College came, and of course we've grown considerably in this area since Shawnee College came. It's really brought a lot of good things for people in this area...The schools, I think they work really hard around here and really strive in our schools... I think the community overall just really strives to keep everything going and we have what we have." (Karnak, Small Business Representative)

"The college is an improvement for the younger people and for the people that work there," (Karnak, Long-term Resident)

"You used to have to go to SIU [Southern Illinois University], or Cape [Cape Girardeau, Missouri], or Murray [Murray State University, Kentucky]. Paducah was probably the closest place you could go and get any kind of training or anything. And of course, the college has brought all of that." (Karnak, Education Representative)

Some of Karnak's infrastructure was not viewed favorably by key informants. Key informants perceived Karnak as a small farming community that lacks essential services. Business ventures that once provided various goods and services are no longer present in the community. The issue is compounded by the remote location of the community that compels residents to travel longer distances in order to access services provided by larger settlements.

"Let's see, the last twenty years, we're down to, we do not have a gas station now. You know, out to the corner on [highway] 169, a few miles out of town, for service. We still have our grocery store, and we used to, probably within that range maybe we had two

grocery stores, so we're limited in that sense, so I've seen services such as that change.”

(Karnak, Community Services Representative)

“If we shop, we have to drive a distance to either Kentucky or Missouri, or northern parts of Illinois. There's nothing right here, per se, at all. This is a farming community.”

(Karnak, Long-term Resident)

“We don't have a lot of restaurants available to us. Shopping, you know, not a lot of shopping.” (Karnak, Small Business Representative)

Key informants also expressed dissatisfaction with Karnak’s water supply system. It was reported that due to the frequent malfunctioning of the water supply infrastructure, management authors frequently issue public notices for residents to boil their water before it could be safe for drinking and food preparation. On numerous occasions during visits to Karnak as part of the fieldwork, I observed “Boil Water” sign posts along the major roads in the community.

“Yeah, they need to get the water [fixed], always boiling water. They have a water break quite often and to me, that’s one thing that really needs to be addressed ...” Karnak, Community Services Representative)

“We've always kind of had water problems. I guess that's probably our worst because we'll be on a boil water [order] ...” (Karnak, Community Services Representative)

Another source of dissatisfaction among key informants is the deteriorating housing situation in Karnak. Problems identified by key informants include the aging of the housing stock and the inadequacy of housing maintenance. One key informant traced the source of the problem to the general decline in sense of pride in the community. Others also saw the neglect of housing maintenance as a problem that is more prevalent among the younger generation. Also, some research participants felt that fewer of the people moving in to Karnak on a short-term

basis are willing to invest time and money in housing improvement, as these newcomers are likely to be tenants rather than homeowners.

“Some people just don't keep their yards clean; their houses are not very clean... Right now I can drive through town; I can just go up streets. I'd see and I'd think, ‘Oh, why don't they get out in that yard and get that junk picked up out of their yard?’ ... The older people did, but some of the younger people, they just rent ... I don't know what to say, whether they don't take interest in it or I just don't know what, but they just let it go most of the time. A lot of times the town will have to mow the yard and then send them a bill, and you would think that the younger people would mow, but apparently they were not taught to do that, I don't know...” (Karnak, Long-term resident)

“The homes are aging, they're older. They are not up-kept. People don't clean up their yards. There's a lot of that that needs to be addressed. That doesn't really have anything to do with the Cache or anything, it's just a matter of pride in your home... I think there's rental property in town that is not kept up. People don't have pride in it because they don't own it, but yet the owners of it do not take care of it either.” (Karnak, Small Business/Education Representative)

Community Dynamics

During the fieldwork, questions were included in the interview guide that were intended to reveal key informants' perspectives on opportunities for improving human well-being in the community of Karnak, threats that could shape the community in the future, and the ability of community members to take actions needed to benefit from the existing opportunities and to reduce the threats facing the community. The results from the analysis of this data are presented

in this section under the following sub-categories: community threats; community opportunities; and community adaptive capacity.

Community Threats

During the interviews, research participants were asked about perceived threats, which could be trends or events that could cause a decline in community well-being. The responses indicated that flooding and other natural disasters, economic decline, including job loss were all major concerns to Karnak residents. Concerns over climate change impacts were also expressed by a handful of key informants when a question on this issue was directly asked during the interviews.

When key informants were asked about threats to their community, flooding was the most frequently mentioned concern. Some key informants traced the cause of the floods to past human modification of the hydrologic system in the watershed through the construction of engineering structures, such as the Post Creek cut-off while others blamed it on current management actions on the protection and restoration of the wetlands in the watershed. The lack of repair of a breach in the Karnak levee that occurred in 2002 was mentioned by key informants as a major contributor to the flood threats faced by the community. Built in 1952 at the point where the Post Creek Cut-off drains the Upper Cache River into the Ohio River, the Karnak levee had a floodgate installed that was intended to open when the Cache River levels were high, so that water could flow westward across the valley into the Mississippi River diversion. Years of sedimentation reduced the effectiveness of this channel, and resulted in water bypassing the middle Cache channel and flowing directly into the Post Creek cut-off, even when the floodgates were open. In 2002, the gates experienced a catastrophic failure during a flood event and the breach resulted in greatly declined water levels in the middle Cache channel. Because the gate is

now open indefinitely, high water events (such as from heavy rainfall) causes a reversal in direction of flow of the river, making it challenging to control water levels and subjecting Karnak to flooding from the Cache River (Olson & Morton, 2014). Disagreement over the party responsible for maintaining and repairing the levee has caused it to remain in disrepair for well over a decade. A consequence of the floods that was mentioned during the interviews is the deterioration in housing quality in the community.

“Because of the wetlands, they [CRWJVP] won't fix the breach in the levee, which in turn when the rivers rise, it can create flooding in our community. We went for two weeks without water and sewage because of flooding. That's a hard thing to do: two weeks.”
(Karnak, Small Business/Education Representative)

“One problem that we've had that has really been a big problem for us has been the hole in the levee. That allows us to flood a lot easier because, Post Creek cut-off, a lot of water runs down that. And when water runs back in there, it surrounds the town, so we've had some problems from that. We've had wet-spot problems. We've had problems with basements being wet, mold problems, and things that had not really happened in the last 15 years since the levee broke because the water comes in and it stays for a while ... So there's problems from that.” (Karnak, Education Representative)

Other key informants went beyond the flooding problem to highlight the community's potential exposure to multiple environmental threats, including earthquakes, and ice storms.

“Well, I know we've had two ice storms and we've had two floods. And the ice storms and the floods have really been problems for us...” (Karnak, Education Representative)

“I think one of our biggest threats will be if we have a natural disaster that we cannot recover from. Earthquake is something that we talk about at my house.” (Karnak,

Community Services Representative)

Additionally, key informants were specifically asked about threats to the community posed by climate change. The responses indicated that most key informants did not believe climate change has affected or will affect the community in the future. However, a small number of them expressed concern over the perceived contributions of climate change to the increasing severity of extreme weather conditions, as well as threats to local ecosystems and community residents.

“Well, the redbud trees have bloomed here down the drive, and it's February 23rd. Fishing, I know that when I was a kid and we would go fishing, the ponds, the lakes and all that were a lot clearer, and now they're so overgrown with, well, we call it algae and seaweed, you know... Well, all the greenhouse gases and stuff starting to warm up and I see a lot more overgrowth than what we had before. I think it has affected our community a little bit, even fishing. Back in the '20s and '30s, I've seen pictures of people going out to the Cache, fishing out there and just pulling out hundreds of fish. Well, if you can't fish and feed your family, what are you going to do? With the problems that we're having with our waterways and problems that we're having with, even my dad talked about, not long ago, he mentioned that he used to go out and haul hay....Only time he really had to put a shirt on is when he would get cold at night, had to put his shirt back on then. Now you go outside with no shirt on and you get burned. So, there has been impact from that around here. The drought that we had after the flood, you know we had flooding in 2011. Then we had a big drought in 2011. That's affected a lot of people in the area. Not so much in town, but around the area you have, there's a lot of farms. And you can't, a farm can't grow anything, you've got to irrigate and that costs money. And how long is it going

to be before the ground water goes away? You use it all up or get it where, a level where you've got to dig another well which costs more money to be able to get that. These steady rains and things that we used to have, we're not having anymore. We're getting storms. You get inches of rain at a time and then nothing for weeks, instead of getting those steady rains we used to have when I was a kid when we would get a quarter inch every couple of days. It would dry up and then we'd get a little bit more. Now we're getting it all at one time. And now we're having all these floods and things.” (Karnak, Education Representative)

“We're in a farm community and the weather conditions affect what happens to all of the crops that's out there. I've seen them plant things out our direction and then they reaped nothing from it. They ended up just bush hogging down some corn ... All I know is, what I saw was they actually bush-hogged the corn down and never did harvest it. My father planted some corn and he said he did not get the type of, as much corn as he's going to need to feed his cattle all summer, or all winter. It does have an effect. We're going through a system right now where it's not rained at all.” (Karnak, Community Services Representative)

Besides these environmental threats, key informants also mentioned the decline in employment opportunities in the community as a potential threat to the community's future. One key informant lamented the possibility of the eventual collapse of the community of Karnak if the loss of the community's population stemming from the lack of employment opportunities is not addressed soon enough.

“Well, again, jobs. You know, we have the power plant set over here and it's a coal-burning power plant. And so that's kind of in jeopardy and questionable, and it's old, it's

outdated and that's the problem...and you just know that the opportunities, there are not a whole bunch right now. And then when the lock and dam is finished and all that pulls up and goes then that is going to be another project that is done. And of course we will then have the new lock and dam, but there won't be the jobs for people. We are going to lose a lot of jobs right there.” (Karnak, Small Business Representative)

“A lot of it is because we don't have the jobs around here that we need to keep them here. If we don't get any jobs down here, I see it [Karnak's population size] getting smaller and smaller, 'til eventually we have a sign out here that says 'used to be Karnak'.” (Karnak, Local Government Representative)

Community Opportunities

Key informants were also asked about the opportunities for improving community well-being in Karnak. Despite the many challenges that have been highlighted thus far, research participants identified several sources of opportunity in their community. Much of the focus of key informants was on the recreation and tourism opportunities provided by the Cache River and its associated wetland ecosystem. Other tourism opportunities, such as the August 2017 solar eclipse, as well as bicycle and relay races on the Tunnel Hill State Trail were also mentioned. Additionally, a proposed infrastructure development project was also identified by key informants as an opportunity for community development.

Most key informants mentioned the community's recently constructed campground, the Main Brothers Campground, as an asset for promoting nature-based tourism as a strategy for the development of the community. Although the community has been receiving tourists from other regions, key informants perceived that the construction of the campground could enhance the ability of the community to provide accommodation and other complementary tourism

services in order to benefit from existing opportunities for nature-based tourism in the region. Key informants were optimistic that these efforts will attract new tourists to the community, thereby generating more tourism benefits to local residents through increased tourist expenditures.

“That's what we're doing with the campgrounds; we're setting it up that they [tourists] can stay here. Instead of going to Marion, Carbondale, Paducah, and staying in those areas, when they can come here and stay, and be able to impact the community by their financial support, by buying stuff here in town. Like I said, if we had a lake to bring more people to go fishing, which again would develop some more businesses, probably tackle shops and feed the income of the grocery stores, and restaurants would be more busy. So those are the things that we're trying to improve and trying to work toward. To use the recreational things we have already to bring people into our area... They bring people down from all around. Go over there to the bike trail. On weekends, you'll find license plates from different states. So they can come here, they can eat, they can stay here in our campgrounds. That helps out.” (Karnak, Local Government Representative)

“I know that this particular town is really hoping that [the Cache River/wetlands] stays and grows because they've even put a campground in our town in the last year. This coming summer will be the first summer for the campground, and it'll be interesting to see if it draws and who it draws and what they're doing. I think it'll be more opportunities.” (Karnak, Small Business Representative)

Key informants also identified other tourism opportunities in the region from which the community could potentially benefit, such as the Illinois River-to-River Relay race. The annual River-to-River Relay, organized by a private committee and held in April of each year, is an 80-

mile foot race that draws participants from not only southern Illinois, but all parts of the state, as well as neighboring states. The race starts near the Mississippi River, in the Shawnee National Forest, and ends at the Ohio River in Golconda, Illinois. The race consists of relay teams with both participants and spectators following in vehicles. Competitors pass through Karnak's campground at a Tunnel Hill State Trail access point, where spectators are also likely to stop. According to the official race website, due to the popularity of the race, registration restrictions have been implemented with a limit of 250 teams participating. This guarantees approximately 2,000 competitors and additional spectators present in southern Illinois for the weekend of the race. Local government representatives noted that having prior knowledge of these events could allow them to be prepared for hosting the visitors. Key informants also noted that the construction of the Main Brothers Campground in Karnak should enhance the benefits the community derives from these programs. Tunnel Hill State Trail, a 45-mile bicycle and hiking trail managed by IDNR, has been known to host bicycle races as well.

“Like there's a bike thing coming up in September. There'll be hundreds of bikes coming in. So we'll be prepared for when they come in. There is a 50-mile and a 100-mile race on foot every year. And so, you know, there for a couple of years we didn't even know that. So we weren't even prepared for when they got here. And now we're able to prepare for it, we can set up food stands and some vendors and stuff here. Again, we've got the campgrounds, so if they want to spend the night, they can do that.” (Karnak, Local Government Representative)

Key informants also identified the impending 2017 solar eclipse as a potential opportunity for tourism promotion in the community. The total solar eclipse was an event projected to draw tourists to the region by the thousands due to southern Illinois being a prime

viewing location. Key informants described various activities Karnak and other communities in the region were undertaking to prepare for the event. When asked if opportunities to expand on tourism were present, one respondent felt the community had opportunities upcoming, and that the community had been making an effort to be more attractive to visitors.

“I think so, especially with the conditions now with the eclipse... things like that, where people normally pay thousands of dollars to go get on a cruise, or get on a plane, or something like that to go view it. You know, we get to have two of them there. That's got to help our area. I notice a lot of people cleaning up a lot of stuff that was just overgrown or messed up, trying to get ready for the influx of people that are going to be coming in. Not just Karnak or this area right here, but pretty much all over Southern Illinois. I think there'll be a little bit of a letdown afterwards, but I think that all these things that are happening in the community you know, it's possible for us to be able to build off of that. The better people feel about where they live the better they'll do, the healthier they're going to be. So that's a big thing.” (Karnak, Education Representative)

Other key informants mentioned a proposed road transportation infrastructure development project in the southern Illinois region as a potential opportunity for enhancing the development of Karnak and other rural communities in the watershed. The Shawnee Parkway project is in a preliminary study phase, but proponents of the project hope to address the region's lack of an east-west transportation corridor in the southern part of the state, which inhibits travel to some degree, and is a contributing factor to the inadequacy of viable economic activities in the southern part of Illinois. However, opposing views on the project have been expressed based on the expensive nature of the project, as well as concerns about its ecological impacts, such as fragmentation of the Shawnee National Forest.

“I've been involved with the Shawnee Parkway project, which is an East-West Corridor across Southern Illinois. There's a lot of resistance to that, but there's some benefits that could come from that, that would benefit both sides. It could benefit, it could bring more traffic into the Shawnee National Forest, into the Cache River Wetlands, and it could provide an opportunity for some business development, to cut down on that travel time. But there's been a lot of opposition from the environmental side on that project. So I think people need to be a little more open-minded when it comes to those things... But I think just involving the communities more; maybe it's just at the mayor and the city council level, but that information needs to be shared out within the communities of what they're doing and how it is impacting our community.” (Karnak, Small Business/Education Representative)

Community Adaptive Capacity

During the interviews, key informants were asked about their perceptions of the ability of the community of Karnak to act together in response to threats and opportunities in order to enhance the well-being of the community's inhabitants, i.e. the community's adaptive capacity. The responses indicated that the community displayed multiple instances of adaptive capacity through the utilization of community resources for collective action to deal with floods and other threats, as well as the ability to capitalize on opportunities, such as nature-based tourism to improve community conditions.

Key informants often commented on the construction of the Main Brothers Campground, which was officially commissioned during the course of this study. The goal of the campground is to attract visitors as part of a tourism-based community development strategy. Key informants saw this new project and other tourism initiatives as demonstrations of the collective ability of

community members to mobilize local resources in order to take advantage of an opportunity for community development.

“Well, we built campgrounds sitting over there on the bike trail. That's gonna be more influx into town. Hopefully they'll buy from the grocery store, eat at the restaurants, and possibly say ‘Hey, this is a nice little town, I'd like to start a little shop here or something and come back’ ... We've got committees working together now trying to figure out how we might be able to bring people in. Different activities that the town people have tried to develop in order to bring people in that might be interested in coming here.” (Karnak, Local Government Representative)

“Before, we didn't have a bike trail. We're trying to take advantage of our local natural resources, and... give people a place to go or a place to come, to be able to take advantage of that. And with the campground, it's going to bring more people in from other areas, but it's also going to make us a little bit more resilient, enabled to be able to get to earn money from people that want to go camp. They want to go ride bikes. They want to come to our town and spend money in the store. I think that's really going to help a lot.” (Karnak, Education Representative)

“Well, once again, I think the tourism aspect is something they [the community] could capitalize on. I think they've already made good in-roads. They've had a couple events already. They're planning an event for the 2017 eclipse. So I think they're being proactive when it comes to those types of things. There is a car show this summer so I think they are doing some things to capitalize on the tourism aspect ...” (Karnak, Small Business/Education Representative)

However, some key informants were less optimistic about the capacity of the community

members to undertake major economic interventions that could reverse the declining economic conditions in the community. The small population size of the community was mentioned by key informants as a major constraint to its capacity to attract and retain viable economic activities.

“We're not going to get a big factory. We're not going to get, we may get a few small businesses, but we've had another restaurant in town that's opened and closed, and opened and closed. There's one there that's really kind of hard to compete with that business. They've been there a long time. They put out a good product. So it's difficult for another restaurant to come in. And I know they've talked about trying to bring like a dollar store in. I know there was some discussion at one time about Casey's, trying to get a Casey's in, but nothing has ever materialized with that... I think it depends on the type of business. I mean that's what I do here. I run this small business development center... So, anytime we can work with a business to try to help them you know, we do have some businesses in town that are very successful. You know, they do a good job, there's just not a lot of them. But I think the opportunity would be there ... You can't go in a small community like that, and try to compete with some that are already there.” (Karnak, Small Business/Education Representative)

“Well I'd like to see some more recreational opportunities. I'd like to also see some industry come in the area, you know, we're a small town, and we try to get a grocery store or a gas station in, well they say 'you don't have a big enough population'. Even though we got [Highway] 169, we got 2200-2400 cars a day to come through here, they say we don't have enough population for them.” (Karnak, Local Government Representative)

Other manifestations of community adaptive capacity were reported in the area of

disaster preparedness. Several comments were made by key informants reflecting the ability of community members to cooperate with one another in responding to various natural disasters, such as floods.

“Well, the Methodist Church in town, they had a disaster committee formed and they put a generator in, and had a lot of things in case there was a disaster, they'd have a place to go. And they've got addresses of people like out of town that's still in the Karnak area that needed help on food and light and stuff like that.” (Karnak, Education Representative)

“I think they are, I mean as far as resilient, people come back. I mean we've dealt with flooding, we've dealt with severe weather, we've dealt with ice storms. I think people know that they have to be able to take care of themselves primarily... You know, when we had the flooding going on a few years back, the town organized sand bagging. They came around to every house offering sand bags if you needed them. So I think the community comes together in the event of a disaster... But I think the community itself is resilient. I think everybody's very willing to help their neighbor do what they have to do in the event that it's needed.” (Karnak, Small Business/ Education Representative)

“From looking back at during the ice storm and other times that flooding, and the help up there that the volunteers that showed up for sandbagging ... I really noticed a sense of cohesiveness, how they all pulled together. So I think they would be resilient in times like that, really. That's just an opinion again but I have seen it really happen. A lot of organization and volunteering and when it's needed, when it's really push comes to shove, they jumped in there and did it. So I think we would be resilient enough to make it as some of the bigger [towns] do.” (Karnak, Community Services Representative)

Besides the perceived ability of community members for self-mobilization to deal with natural disasters, Karnak's adaptive capacity was also associated with the community's historical experience in dealing with these specific threats.

"We had two ice storms and two floods. We're a lot more prepared than what we were. Because as far as the floods, we weren't getting much support from the drainage district, so our floodgates weren't operating properly. We actually got money from FEMA that was paid to us for volunteer hours. Instead of putting that back into the local infrastructure, buying fire trucks, and buying this, and paying salaries, we put that money back into flood mitigation so we wouldn't have that anymore. So, we actually rebuilt our floodgates. We went out there ... on the west side of town where the water would come back in through ... And we actually put clay dirt along that so water doesn't seep into town as much. We're a lot more prepared for stuff like that than what we were." (Karnak, Education Representative)

Although the majority of key informants expressed confidence in the capacity of the community to deal with various disasters, others did not feel that their community was prepared to successfully adapt to natural disasters of high severity. Some respondents mentioned that the community lacks the initiative to take proactive measures that could contribute positively to the community's adaptive capacity.

"Even though some of the local groups are doing disaster preparedness, I don't think we're prepared at all for something to happen like that. I think we need to have groups that get together and make plans. They need to, someone needs to take the lead and train others on what they need to do for basic survival ... We've done it here at the office. But have we followed through? I think we're a lazy society. We don't follow through on what

we know we need to do.” (Karnak, Community Services Representative)

“I’m not sure they’re prepared at all. I think there’s ways they could maybe cut back, but I’m not sure that they’ve really looked at the big picture when it comes to that. I don’t know that. I’m not involved with the city council or anything. But just from the outside looking in, it does not appear that [they are].” (Karnak, Small Business/ Education Representative)

Community Participation

This section presents data on key informants’ perspectives on community participation in the management of the watershed, as well as the drivers and barriers influencing the participation process. The assessment of community participation in this study is based on the level and frequency of interaction between community members and agencies operating under the CRWJVP, including IDNR, USFWS, DU, TNC, and NRCS in their resource decision-making and implementation processes in the watershed. The data is organized around knowledge, motivation, actual community involvement in the activities of the Joint Venture Partnership, and barriers to participation that emerged as major sub-categories during the data analysis process.

Knowledge

Overall, knowledge about the CRWJVP and its management activities seemed to vary greatly among the key informants, ranging from those who had virtually no knowledge about the watershed and CRWJVP, to those who were very familiar with the restoration efforts and other management activities of the CRWJVP, as well as the legal implications of these management efforts.

When asked to share their knowledge of the CRWJVP, most research participants were either unfamiliar with the partnership, or had heard of it but were unaware of its membership and

management activities. Some of the key informants who expressed familiarity with the CRWJVP tended to associate it with the role of federal and state representatives. Most were, however, less familiar with the involvement of private organizations, such as DU and TNC. A couple of participants that claimed to be members of DU, for example, were mostly unaware of that organization's role in the CRWJVP. In some instances, it was unclear whether research participants simply did not want to talk about the CRWJVP or they truly did not know much about the organization.

"I know nothing about it. This is the first [time] I have heard of it... I hate to keep saying it but I don't know anything about it. I don't know anything about Cache River. I don't know whether it does any good or not because I'm not familiar with it ... It's not much of a tourist attraction either. So, I don't know." (Karnak, Long-term resident)

"When you first asked, I did look it up a little bit online so I can, I don't know much about it other than that. What its purpose was, I had not heard of that." (Karnak, Community Support Services)

Some key informants seemed more knowledgeable about the CRWJVP and its management activities, especially regarding the reconnection of the Upper and Lower Cache Rivers. Knowledge on the governance of the watershed tended to be higher among key informants who were involved in local government or other community organizations. One participant in local government was quite aware of the management in the Cache River Watershed, especially regarding the role of the IDNR.

"We get flooded quite a bit. DNR[IDNR] has helped us put flaps on different culverts and stuff to keep water from coming in when we get a lot of bad rains and stuff like that. They've helped us with that. We know that there's other projects going on, yeah. I know

that. Do we want to discuss it? Probably not at this time. Not unless I get the authority to do that.” (Karnak, Local Government Representative)

The disparity in the level of awareness of the CRWJVP among community members suggests that there is certainly room for improvement in the dissemination of information on resource management in the watershed. However, it is helpful to understand the motivation behind those who do attempt to participate or be informed on the management of the Cache.

Motivation

To explore community members’ motivation for participating in the governance of the watershed, key informants were asked about the meanings and benefits they associate with the Cache River and its wetlands. The responses ranged from positive to negative perceptions. Place meanings informing these perceptions were largely socio-cultural and economic in nature.

Some key informants expressed positive perceptions about the watershed because they valued the forested areas, wildlife, wetlands and other ecosystem components of the watershed as sources of recreation, tourism and environmental education.

“[The community] likes the wooded areas. They don't want to see the trees destroyed. They like bringing more people into the area [through tourism].” (Karnak, Local Government Representative)

“People come from all around, actually, to enjoy the Cache River, and it's just kind of amazing to me ... I didn't think anything about it as I was growing up, as a teenager, but it's certainly developed now, because they have the canoeing on it and they bring field trips, kids, schools, and I know they do all kinds of studies with the different snakes and wildlife and plants and all that so, it's good.” (Karnak, Small Business Representative)

An appreciation of the cultural significance of the Cache River and its wetlands as

symbols of the history of the region was also mentioned by some key informants as a source of motivation for the effective management of the watershed.

“I like history and I'm not from here. I moved here about 40 years ago from West Virginia and I think I'm just as interested in stuff that goes on around here than somebody that was raised here. There's a lot of history.” (Karnak, Community Services Representative)

Other key informants expressed positive perceptions about the watershed and the need for its protection based on the role of the Cache River as a source of livelihood for community members. In view of the unfavorable economic conditions and distance to shopping centers, access to fresh meat and produce could be limited for most communities in the watershed. Opportunities for fishing and hunting in the watershed could, therefore, constitute an important livelihood strategy.

“Some of the silt that was taken out, they're looking for places to put some of that stuff, but it doesn't make good fill for ground and things like that. There still needs to be work done to it, and I feel that we do need to spend the funds to be able to do it. Not just because of the environmental reasons, but also because families need the food that's generated from a wildlife area like this. That's a big reason right there.... We need to be able to eat and eat cheaply. I can't afford to go to a restaurant all the time, I've got a kitchen, I cook. People have kitchens and they cook. If we could go out and fish, and somebody eats, then that's the big thing right there. That was my whole point from wanting to get involved with a lot of the things with the Cache.” (Karnak, Education Representative)

Conversely, other key informants who also assigned economic value to the watershed

were less motivated about its management because they perceived that the natural resources in the watershed have not been adequately utilized to sustain economic activities in the region.

“I really don't think many people that are there now are as concerned as what they were because it doesn't affect the jobs.” (Karnak, Education Representative)

There were also a couple of key informants who did not express a specific form of place meaning they attach to the watershed and as such, were passive with regard to the management of the watershed. Once again, this highlights the apathetic feelings that some community members possess.

“I don't know. I don't really think about any of that. I really don't.” (Karnak, Long-term resident)

Involvement

Involvement was operationalized in the data analysis as the extent and the ways in which community members participate in the management of the watershed. The results were mixed. Some research participants discussed various ways in which the residents of Karnak have been involved in the management of the watershed by the CRWJVP, such as coordination with the CRWJVP to address community concerns, and participation in outreach and educational programs organized by the CRWJVP. However, it was also reported that community participation in the decision-making processes of the CRWJVP has been very minimal, if at all.

Key informants' responses generally indicated that community involvement in the governance of the watershed occurred in the form of participation in various educational and public outreach events by the CRWJVP. These include educational tours targeting local schools and other specific groups, as well as festivals and other programs designed to generate awareness among residents in the entire watershed and beyond.

“Yeah, there's people attending meetings. Just like they have the wetlands thing every fall and spring, the NatureFest or whatever you call it. We were more involved this year because we made a point of it, because we have the campgrounds. So we are more involved in it. And DNR [IDNR] brought signs over this year to establish so that more people in the community could understand what was going on.”(Karnak, Local Government Representative)

“So I mean, from an educational standpoint, I know at the college level they do tours of Cache. They canoe the Cache. They go out, and then we are part of the, what's it called? It's all got to do with the Cache. One of our instructors oversees it ... It brings in area school teachers. And they spend two weeks, and they study the Cache ... And then they go out on field trips and study the Cache.” (Karnak, Small Business/Education Representative)

Interactions between community members and members of the CRWJVP aimed at coordinating efforts to address various community concerns were also mentioned by key informants as a form of community involvement. Tourism promotion and flood control are two community priorities that have involved coordination between the community and the CRWJVP.

“Based on, for instance, I know some of those [CRWJVP agencies] were mentioned in the dedication of the new campground and so forth, and it was a very nice turn out for that. And I heard those names and representatives from there, which I hadn't heard those names before. So, I think we are, to some extent, I don't know how much. But probably within what you've just informed me of the five, I would think we're probably a little more connected to that than people would realize just from that, and the display of people in Karnak that showed up for that dedication, too, that cared that much to see that

dedicated.” (Karnak, Community Services Representative)

“I mean, they have an office here on our campus. Fish and Wildlife [USFWS] does. And I think some of the other agencies work out of there also, so I have a friend that works for them. And I've always known the refuge [Cypress Creek National Wildlife Refuge] manager. We've involved him in different parts of activities that we have here, or meetings, or anything that we feel like we need to bring the community together. We always include the refuge manager ...” (Karnak, Small Business/ Education Representative)

“Most of our involvement [with the CRWJVP] has turned from fish and wildlife to floods... I know there's probably a few concerned people. And like I said, my main focus has been flood control. As a member of the board [Drainage District Board] and then the mayor, that's the one thing that they're concerned... The most vocal proponents have been the ones that don't want the levee fixed because it allows the water to flow out.” (Karnak, Education Representative)

Conversely, there were research participants who saw no evidence of community involvement in management of the watershed. Key informants were particularly emphatic on the lack of community involvement in the decision-making processes of the CRWJVP. Some of the responses suggested that the lack of interest among certain segments of the community, such as farmers and hunters, was the source of the problem, while others traced the problem to limited opportunities for community participation.

“I don't believe they're [community members are] involved at all. I think it's probably kept to those groups. They [the CRWJVP members] are very seldom including the local people in on it. You probably have your group of farmers who are totally against it, and

then you have your hunters who don't realize what's really in their backyard that they can take advantage of.” (Karnak, Community Services Representative)

“To my knowledge, there's not been [involvement]. And there could have been, but I'm not aware of any public meetings or anything that has, have asked people ‘what do you think? What's your opinion of this?’ I've always considered it [the CRWJVP] a pretty closed group that made the decisions, and worked with the state, and US Fish and Wildlife, and did those things. But I'm not sure there was a lot of public input into those meetings. I may be wrong, I'm just not aware of any... Like I said I knew when they were doing the Save the Cache, when that group formed, but I don't know if any of those people are still involved or, I really, I honestly don't have a clue.” (Karnak, Small Business/Education Representative)

Other key informants also mentioned that while they believe that public involvement has been lacking, it has improved in recent years.

“I don't think that they've [community members have] been very involved to this point, but I do think it's growing. You know, I do think people are more aware. I think people are kind of surprised like I am that, hey, people come in here to hunt and sporting events and, like I said, research, and to do activities on the Cache. And I think it's growing.”

(Karnak, Community Services Representative)

Participation Barriers

Key informants were asked about the factors that inhibit community participation in the management of the watershed by the CRWJVP. Lack of awareness about CRWJVP activities, lack of opportunities for participation, and lack of capacity were commonly cited barriers to community participation.

Several key informants mentioned the lack of access to information about meetings, activities, and events associated with the management efforts of the CRWJVP as a barrier to participation. Others also believed that this lack of transparency in the management efforts of the CRWJVP has led to mistrust between community members and the CRWJVP, further widening the divide between the two.

“I don't think that they were ever informed that well. Things were going on that people didn't know ... That kind of turned people off. Until they found out that things were different from what they heard before, they actually saw things happen. When people see things happening and are more open with information instead of trying to say 'we'll keep this to ourselves', when they're able to get the information out, and let people make their own judgment, and if the information comes out to be true, people will back it.” (Karnak, Local Government Representative)

“I think a lack of knowing when those activities are going on. Or they're, like we talked about a little bit before, people are so involved in themselves or not wanting to be a part of their community or to give their voice when things are going on.” (Karnak, Community Services Representative)

“I think for the most part people don't, people probably are like me and don't realize that on certain Saturdays and Sundays and weekends that, we don't realize that there are things going on at the Cache that we don't even realize are going on. That people are coming in here to enjoy and do, and I don't think we even realize that there's people doing that.” (Karnak, Small Business Representative)

The interviews also revealed that another major inhibiting factor to community participation in the management activities of the CRWJVP is the lack of opportunity for

involvement. Although meetings held by the CRWJVP are open to the public, information on these meetings is not readily available to the public and no mechanisms for integrating stakeholder input into decision-making appears to have been established by the CRWJVP.

“Well I never hear anything about any of those activities. I mean, I know they have some activities at the Barkhausen Center, but they're more just open to the public type things, but not being involved in the actual partnership or being notified of meetings or anything like that. And in my capacity here, I'm the one that would receive that information, and I've never known of any. Now I have gone to a couple of meetings at the Barkhausen Center, and here at the college. They've used our facilities when they were doing the mapping for the floodplains and all that, and they were involved, but I'm not sure they initiated the meetings. But as far as notification or public notice that they're meeting, I've never heard of that ... I think if the joint venture [CRWJVP], if they included the community more, and that's not saying that everybody would participate, but maybe hosting some public meetings to talk about those things. Talk about things that impact those communities. Like the flooding issue, talk about those things and maybe our mayor has been involved with that. I'm not aware of it but that doesn't mean that it doesn't happen. I do know there have been meetings with the corps of engineers [US Army Corps of Engineers] and a lot of others that, and to no resolution on it. But involving the communities, hosting some public meetings, let them know where they're going with different projects.” (Karnak, Small Business/Education Representative)

Limitations in the capacity of individual community members and organizations were also mentioned by key informants as a barrier to community participation. The lack of time among the working-age group and transportation challenges among the elderly population were

some of the capacity constraints that were mentioned by key informants.

“It'd probably take to get someone to get the community really involved in it. It'd probably take quite a bit of organizing and probably several people to empower them to do that. At that part of it, the motivation in it and arrangement and so forth and the volunteering is difficult now. I know it is for me here with committees and things as opposed to how it used to be. People work longer hours and more stress out there. It's a little more difficult to get things like that together, volunteers for interviews, or anything. It's a challenge, I'll say, on that... transportation in this area, sometimes that can be, it depends on where it's located and things because we have some really knowledgeable senior citizens. But some of them don't even drive anymore and Shawnee Mass Transit is our only source of outside transportation to really get anywhere. So [it] depends on where something's located.” (Karnak, Community Services Representative)

Outcomes

The outcomes discussed here are those that were perceived by key informants as being directly or indirectly associated with the presence of the CRWJVP and its management programs in the watershed. Key informants' perceptions of these outcomes comprise both negative and positive consequences. These results are presented here using the capital assets framework as was used to describe the community's context and setting.

Social Capital Outcomes

Key informants' perceptions on the impacts of the CRWJVP management activities on social capital ranged from positive to negative. Some key informants reported an improvement in communication and cooperation between the CRWJVP and the community, while others highlighted conflict and mistrust as outcomes of the CRWJVP management actions.

With regard to the positive impacts of the CRWJVP on social capital, a representative of the local government in Karnak reported regular communication between some members of the CRWJVP and the community, although it appears such communication mainly occurs between the community's leadership and the CRWJVP rather than the entire community.

"I think we've got a good working relationship with Department of Natural Resources [IDNR], especially with the one agent we've been dealing with. He keeps us informed. He calls me maybe once a week to once every two weeks with what's going on, what can we do, and gives me any information he thinks he's able for us to pass on...And there's an individual in the Department of Natural Resources that's come down here and we've got to be real good friends ... He tells me what's happening, and I'm able to share it. And so it's made a lot better working conditions. And people have come in and said 'hey, things are changing, we see it now'. So that's what it takes." (Karnak, Local Government Representative)

Other key informants' responses suggested that a more ad-hoc form of communication and interaction occurs between the community and the CRWJVP, typically in response to crises events, such as floods.

"Well, we've always had good communications, especially in times of, when there was trouble, in times of the flood and stuff like that. They've always been there so I've got no problem ... The state's always been good when there's been problems, and there's plenty of things. And they've had different meetings and things down here at the college that have dealt with that, so I've got no problem with any of the communication that we've got. It's always been really good, and they're always listening to us, you know, what we feel like we need." (Karnak, Education Representative)

In spite of these positive impacts of the CRWJVP on community social capital, some key informants also noted deterioration in the relationship between the community and the CRWJVP as a result of conflicts over various management issues. For instance, tension over the management of the Karnak levee appears to have damaged relationships between the community and the IDNR in particular. On this critical issue of flood control, key informants' responses indicated that some community members feel misled due to the lack of sincere communication of accurate information by the CRWJVP members. As a consequence, community members' trust for the CRWJVP has eroded.

"You have to understand that DNR [IDNR] and the drainage board have been in court for over 10 years trying to do what DNR wanted to do. They couldn't, they couldn't get the drainage board to even sit down and talk to them. For 10 years this thing's been in court. And so people say well 10 years you know it's ridiculous, nobody's doing anything, nobody's going to help us. So, they kind of turned against everybody. I go to meetings and I say 'Well, we've heard these kinds of stories before'. Well after 10 years you're gonna say 'Well, nobody's helping'... With the situation here in Karnak with the flooding, they were lied to, quite a bit. And 'til we begin to deal with the Department of Natural Resources [IDNR] and get the truth from them and find out what was happening, we've got a big ditch running through Karnak. A drainage board owns that. We pay taxes on it. They don't clean it. We spent \$28,000 on new culverts and gates down here that they should have bought to keep us from flooding. They don't do that. So people have a mistrust of the government and this board for taking care of stuff. We've got things that we've had to take care of that cost us money after people pay taxes for it. Shouldn't have to. It's not ours. So you've got a lot of mistrust, a lot of misinformation going about. And

so when we started working with our Department of Natural Resources in understanding what was going on, people began to say okay 'We see this, we see that, you know the Department of Natural Resources is trying to help us' and it changed a lot of feelings.”
(Karnak, Local Government Representative)

“There’s a levee that's breached outside of Karnak which has caused flooding. It's what caused the last flooding. That was very significant for the community. They won't fix it because of the wetlands. So a lot of the attitude is like, ‘They don't care about us. They're going to let us flood.’” (Karnak, Small Business/ Education Representative)

Some key informants also described increased tensions among community members as they attempt to reach collective decisions in response to threats, such as floods, stemming from the CRWJVP management actions.

“Everybody's working together except for one group. And that was my first introduction to this, was in August 2005, we went out there and everybody is arguing about not getting the levee fixed. I told them, ‘This is the first time we have a flood, there's going to be a problem. Already had two of them.’ And they were still arguing about who needs to get that fixed....The problem is, there's too many people that want too many different things, and it holds back what we really need, we really need to get that fixed so we can have a healthier wetland, and have a healthier Cache. All that can be controlled if there's a mechanism to control it, but there's no mechanism to control it right now, so... Let's get the courts out of it and let people talk and get it taken care of. Get rid of the people that are just in it for themselves. It's not just about me. Things shouldn't be just about me, and it's been too much about that, and they can't really work like they should.” (Karnak, Education Representative)

In sum, there have been both positive and negative repercussions on social capital in the community of Karnak since the CRWJVP was formed. Some of it involves relationships between the community members and CRWJVP agencies; others involve the interactions amongst community members. While there has been some display of tension, conflict, and mistrust since CRWJVP agencies began working near Karnak, there have also been improvements in the communication between the community's leadership and these agencies, especially IDNR.

Human Capital Outcomes

There were only a few, mostly positive outcomes in the human capital category that emerged from the analysis of the key informant interviews. Key informants mostly discussed the educational benefits associated with community involvement in some of the CRWJVP activities, such as local festivals and nature-based outdoor activities. The nature-based outdoor activities were seen as particularly important in instilling a sense of appreciation of nature among the younger generation who would otherwise have been spending their time indoors.

“Each year there is a festival that is held in Ullin, and they bring about an education component to that event. It's not just a community getting together to hang out for the day. There is that chance to do that. Then they also offer the canoe trips, and the trip to the Wetland Center and everything that's going on at that same time.” (Karnak, Community Services Representative)

“Well, they've always ... hosted different programs for kids or for anybody that would want to go out and canoe. As an educator, I liked the fact that they gave us opportunities to be able to go out and see things. People need to get out of their homes. They need to get away from Netflix and Hulu and all that and get outside. They've always given us opportunities to get out and do that one program or another, family [programs] and

things. They try to promote that, so that's always good.” (Karnak, Education Representative)

Physical Capital Outcomes

Key informants’ responses revealed both positive and negative impacts of the CRWJVP management activities on the physical capital of the community. While the CRWJVP was perceived to have contributed to the construction of new facilities in the community and the watershed as a whole, it was also learned that infrastructure damage has been sustained from flooding caused by CRWJVP management actions.

Key informants perceived the construction of the Main Brothers Campground in the community as an essential step in the development of community infrastructure for tourism promotion. The development of this critical tourism infrastructure was seen by key informants as the outcome of cooperation between the community and the CRWJVP. The community’s interaction with the IDNR seemed to have played a key role in the management of the campground project.

“We’ve entered here into an inter-government agreement with the Illinois Department of Natural Resources. They have the restrooms and water over here by the bike trail. We’ve entered into an agreement with them that we’ll take care of the restrooms and a portion of the bike trail. So that way we have a working agreement between the state of Illinois and ourselves to help bring in. And so they promote, they’re promoting our campgrounds, they’re helping us do that. They’re giving us information on what’s coming up next in the programs that they’ve got developed.” (Karnak, Local Government Representative)

Additionally, the construction of the Henry N. Barkhausen Cache River Wetlands Center, or ‘wetlands center,’ as it is commonly referred to, was mentioned by key informants as a

welcome addition to the infrastructure in the watershed. Located just a few miles from Karnak, the wetlands center includes an exhibition on the history of the Cache River Watershed and a visitor information center among other resources. Also, the center often hosts educational programs and events. As such, it could contribute to Karnak's tourism development agenda.

"Barkhausen, yeah, that's really been ...Schools go there, and scouts go there. It's just really nice place. You learn a lot and they have a lot of programs and activities free to the public. And I think they've been having quite a few attend." (Karnak, Community Services Representative)

In spite of the potential benefits from these infrastructure projects, key informants also raised concerns over the damage to community infrastructure experienced from flooding due to the management of the Karnak levee by the CRWJVP.

"It hasn't been good over the last few years, but I think that was mainly because it was problems with the levee and then having it blocked up. When the levee was blocked and the pipes were blocked and water couldn't get out, there were a lot of people [who] had problems with water in their basements. The water table was raised a lot and there was a lot of bad thoughts, and then I think it was April of 2003 the levee broke. Water started rushing out. Everybody's basements dried up, people are a lot happier. But there's still a problem there Again, I'm sorry to go back to that levee. The levee's a big problem. There's a lot of water coming down that damn Post Creek, especially when it rains. Well, that water flows into Post Creek. It floods everything over there. And I know it's supposed to be a wetland, but it's not supposed to be that wet. And then, since there's nothing there to hold the water back, it gets dry." (Karnak, Education Representative)

The adverse impact of flooding on the housing situation in Karnak is particularly

noteworthy, as key informants linked the floods to a decline in the marketability of houses in the community. This could have adverse implications for landowner motivation to invest in housing maintenance.

“I don't see that it's created a lot of harm, other than the flooding issue. That has created harm in the community. People would be reluctant to purchase property because it's kind of like, ‘Oh, that house floods.’ I know a couple houses that are for sale that aren't bad homes, but when you get to discussing them with people they're like, ‘Oh, no. That floods. Remember? That flooded. That whole area flooded’ ...” (Karnak, Small Business/Education Representative)

Key informants attributed the flooding problem to the stalemate between IDNR and the Big Creek Drainage District over the Karnak levee. Some believed that improved management and cooperation between the stakeholders and the communities affected by the management of the watershed would be a step in the right direction towards solving flooding issues that damage the community's physical capital.

Natural Capital Outcomes

Key informants generally expressed positive perceptions with regard to the impacts of the CRWJVP management actions on natural capital. Responses pointed to an improvement in the condition of the ecosystem itself, as well as an improvement in its ability to generate various benefits. However, dissatisfaction with the condition of the ecosystem was also expressed.

Some key informants expressed satisfaction with the improvements in the health of trees, wildlife, and other ecosystem components that have resulted from the CRWJVP management actions on ecosystem protection and restoration in the watershed.

“It appears to me that everything is thriving. The animals seem larger. There seems to be

more, even though there is lots of traffic and there is that danger for them. The woodlands, the trees, have really grown. I don't know about the protected trees that are in the Cache, but I know that where they have planted and they have let the area go, that it is doing quite well.” (Karnak, Community Services Representative)

“Based on what I know or what I've heard, the ecosystem was in dire need of revitalization in order to protect it. So I'm sure that they have done good things. Not opposed to that. That's really all I know about it. But I'm sure they've done good things.” (Karnak, Small Business/ Education Representative)

Other key informants also expressed satisfaction with the CRWJVP management actions because of the enhanced capacity of the ecosystem to provide various goods and services, such as recreation, tourism, and timber supply.

“It's definitely assisted with the outdoor opportunities and recreation... I just view it as improvement with the restoration to restoring and beautification and that anything pleasant to even anyone passing through, campers, or whoever. Hopefully, they're going to stay longer and enjoy it more. So I think that's, I think it's vital. I think it's a great thing.” (Karnak, Community Services Representative)

“So, they had saved a lot of ... Well, it's sort of a tourist attraction if you like something like that. Love to go through those areas, you know? And that's where the town there has a program every once in a while where they take people to tour different parts of the sloughs. They got some timber there that is virgin timber. And that's something you don't see too often.” (Karnak, Long-term Resident)

Contrary to the favorable perceptions expressed by most key informants, one key informant was dissatisfied with the ecological health of the watershed and attributed this to

conflicts surrounding the CRWJVP management activities.

“The Cache is in a mess ... And I think it's been mismanaged a bit because of the fact that there are people that are arguing and fighting over who owns that levee. They don't want to get it fixed. They don't want to make changes to it. When water comes through that hole, it can damage what little bit of ecological stability that we have with the Cache, so that bothers me. That's a big part of who we are around here.” (Karnak, Education Representative)

Economic Capital Outcomes

Key informants' responses on the economic impacts of the CRWJVP were mixed, ranging from positive perceptions on the contributions of the CRWJVP to tourism in the watershed to negative perceptions on the impacts of CRWJVP activities on local tax revenue.

Key informants reported an increase in the attraction of tourists who come to the region to pursue various nature-based recreational activities, such as birdwatching and canoeing and/or to attend various CRWJVP events, such as the annual NatureFest. Although hard data on the economic impacts of tourism were absent, key informants perceived that the influx of tourists to the region will bring economic opportunities to the local communities, such as increased tourist expenditure on restaurants and accommodation facilities.

“Well they're bringing more people in the wetlands. When they had the NatureFest, they had over 1000 people. So they've gotta come in, possibly through our town. And if they're coming through our town, they have a good opportunity to stop, buy stuff. As they bring in people, I met with about 45-50 people about 2 months ago that came down from Chicago, dealing with the Cache River. They're taking them on a canoe ride, showing them what we've got. Bird watchers come down here, they're having two classes down

here on birdwatching. So, all those people have to come in. And again, they're gonna stay somewhere.” (Karnak, Local Government Representative)

“We have people in town during the warm weather that's here. Down the side streets, they're just looking around and visiting the grocery store and the restaurant, and I think, besides the beautification ... it's helped a little bit with the overall economy.” (Karnak, Community Services Representative)

Negative perceptions on the economic impacts of the CRWJVP were also expressed by key informants who felt that the acquisition of private lands by federal and state agencies as part of the protection and restoration efforts of the CRWJVP has led to a decline in the tax base of local county governments.

“I do see how it has affected the county as a whole and the communities surrounding that where the taxes may not be as prevalent as what they would have been had it been in private property...” (Karnak, Small Business/ Education Representative)

Closely related to the perspective expressed above, there was also the perception of loss of local control over private property as a result of the large-scale land acquisition efforts associated with the CRWJVP management activities. Given that local communities in the watershed do not have formal membership status in the CRWJVP, the perceived loss of local control extends beyond private property concerns to encompass the loss of local authority in the governance of the watershed as a whole.

“People think there's people coming in from outside controlling their lands. As opposed to it being a local, and I know it all started locally, the Save the Cache [Citizens Committee to Save the Cache] initiative. It all started locally but it's kind of out of those people's hands anymore.” (Karnak, Small Business/ Education Representative)

Summary and Concluding Remarks

In this chapter, the general resilience of the community of Karnak was examined by analyzing the current status and changes in the various dimensions of the well-being of the community, threats and opportunities presented by drivers of change, and the overall capacity of the community to successfully adapt to these forces of change. Additionally, the specified resilience of the community to ongoing transitions in water governance in the watershed was examined by analyzing the extent and outcomes of community participation in the governance of the watershed.

On the general resilience of the community, key informants' perception of Karnak is that of a small town, struggling in some areas, while thriving in others. Karnak struggles to maintain its population, economy, and infrastructure base. In other areas, however, Karnak appears to be doing well. With the exception of a few circumstances, social capital appears to be an asset that most residents feel is abundant in the community. Most key informants also recognized the Cache River and related ecosystem as an opportunity for their community. Key informants perceived that their community has demonstrated adaptive capacity in the area of flood response, as well as ongoing efforts to promote tourism development. Nonetheless, there was also the view that current efforts to promote tourism may not be enough to address the structural constraints that account for the declining local economy and population.

Regarding the management of the Cache River Watershed, key informants who held various local leadership positions seemed to be quite knowledgeable about the management activities of the CRWJVP. However, knowledge among key informants representing other sectors of the community was limited. Key informants associated various meanings with the Cache River and its wetlands that served as sources of motivation for community participation,

including a source of livelihood, a resource for promoting recreation and tourism, and a symbol of community history. An exploration of the nature of community participation in the governance of the watershed revealed that educational programs and other outreach activities by the CRWJVP, such as NatureFest, constitute the main avenue for community participation. No direct involvement of the community in the decision-making process of the CRWJVP was reported. However, key informants also noted that various forms of cooperation occurs between the community and the CRWJVP aimed at addressing specific issues, such as flood risk management, and the promotion of tourism. The interviews also revealed a number of barriers to community participation in the CRWJVP management process, such as limited access to information, lack of opportunities for involvement, and lack of capacity on the part of individuals and relevant organizations.

The impact of the CRWJVP management actions on the community was also explored. The results showed that the impacts of the CRWJVP on community capital assets have been varied. Some key informants reported the incidence of mistrust and conflict between the community and the CRWJVP, as well as internal community conflicts on the issues of flood risk management, indicating that both bonding and linking social capital may have been compromised through past CRWJVP activities. However, other key informants also reported an improvement in communication and cooperation between the community and the CRWJVP members, suggesting that linking social capital is gradually being accumulated. Key informants held a favorable perception about the impact of the CRWJVP on human capital through the opportunities for enhanced ecological awareness, especially among the youth. Perceptions on the impacts of the CRWJVP on natural capital were also largely positive, with some highlighting improvements in the health of the ecosystem through protection and restoration efforts while

others focused on the increased capacity of the ecosystem to provide various benefits, such as recreation and tourism opportunities. However, not all key informants were satisfied with the current ecological health of the watershed. Stakeholder conflicts were seen by some as impediments to the sustainable management of the watershed. With regard to physical capital, key informants described both positive and negative impacts from the CRWJVP. Positive developments comprised the construction of a campground in Karnak and a visitors' center a few miles away, both of which are essential infrastructure for recreation and tourism promotion. However, community infrastructure has also been adversely impacted by floods. A breach in the Karnak levee, followed by a long period of dispute over the party responsible for repairing it, has left Karnak without flood protection since 2002 and residents live with fear of the possibility of catastrophic flooding. The economic impacts of the CRWJVP were also perceived by key informants to be mixed. On the positive side, key informants reported an increase in nature-based tourism in the region due to the improved ecological conditions in the watershed. However, large-scale acquisition of private lands by state and federal agencies who are members of the CRWJVP has raised concerns over decline in local tax revenue, as well as loss of local control over private property.

CHAPTER 4

RESULTS ON ULLIN

The previous chapter presented the results on the community of Karnak. This chapter focuses on the community of Ullin. Using a similar structure as the previous chapter, this chapter will begin with a brief description of the community of Ullin. Next, data on key informants' perceptions of the setting and context of the community will be presented, followed by the presentation of data on the resilience dynamics of the community. The subsequent sections will focus on community participation in the governance of the Cache River Watershed, as well as the outcomes associated with the participation process. Concluding remarks will then be provided at the end of the chapter.

Community Profile

The village of Ullin has similar characteristics as Karnak. Ullin is a small community in Pulaski County, Illinois. The estimated population as of 2016 was 420 residents (U.S. Census Bureau, 2017). About 37 percent of the population is over the age of 60, and about 27 percent of residents earn below poverty-level income (U.S. Census Bureau, 2015). The town is located about two miles west of Interstate 57, and features an auto parts store, farm store, a drive-through bank, an assisted living center, and several churches. Immediately adjacent to the Interstate 57 exit is a gas station, a convenience store, a hotel, a restaurant, and an automobile dealership. The nearest emergency room is approximately 17 miles north in Anna, Illinois, while the nearest hospital is located 30 miles west of Ullin in Cape Girardeau, Missouri. Cape Girardeau is also the closest urban settlement from which the residents of Ullin are able to access various higher order services. The village is located on the northern bank of the Lower Cache River. USFWS owns and manages a number of fragmented tracts of land spanning the length of the

Lower Cache River corridor, ending where the Cache River meets the Ohio River in the southwestern tip of Illinois (Figure 2).

Community Setting and Context

In this section, the capital assets framework is used to present data representing key informants' perspectives on the current conditions of the community of Ullin, as well as changes that have been occurring in the community in recent decades.

Social Capital

Key informants' perceptions of the attributes of the community related to social capital in Ullin were generally positive. The key components of social capital that were derived from the data analysis comprise: familiarity and solidarity; community cooperative behavior; and effective community leadership. However, some key informants also expressed negative perceptions about the occurrence of deviant behavior in the community, particularly drug use.

Familiarity of community members with one another was a common community attribute mentioned by research participants. Familiarity was associated with the long-term residence of most community members, as well as the small size of the community. This high incidence of community members' familiarity with one another was also linked to various benefits, such as the local bonds of solidarity and cordial relationships that exist among community members through which expressions of concern and support for one another occur. The existence of these bonds of solidarity seemed to cut across racial lines.

“How would I describe the community of Ullin? As a small community of course. Very personal and friendly. One where pretty much everybody knows everybody, and very quiet, and very cordial community.” (Ullin, Religious Organization Representative)

“Laid back, small, everybody knows everybody. Most of the people, I'd say half of the people that live there now have lived there their whole life... I mean everybody knows everybody and it's like everywhere. I mean sometimes people get nosy. Most of the time though, people understand what you're going through. If you're having problems, they know it. If I'm having a problem and would happen to stop and see somebody somewhere at the store, or at the station, they could almost tell by my face there's something wrong. "What's going on? Do you need to talk about it or something?" And that's what I like about the small community. The big community, don't even know who's next door. Different life.” (Ullin, Law Enforcement Representative)

“There are no racial problems. The black people and the white people, they associate very well. They've known each other all of their lives. They've grown up together. They've had a good relationship. So, race is not an issue here ... We live in a small area and pretty much everybody knows everybody else. I would say it's a close-knit community.” (Ullin, Agriculture/ Big Creek Drainage Board Representative)

Closely related to the sense of harmony among community members described above, another desirable feature of the Ullin community that makes it an attractive place to live is the cooperative spirit that promotes collective action among community members to address their common concerns.

“I would describe the community of Ullin as a welcoming community, a very close-knit community. There are a lot of activities in Ullin that Ullin residents get together on. And I know, like in times of crisis ... A few years ago we had a flooding incident and everybody pulled together to evacuate the Cache River Assisted Living Center over here ... I don't think I've ever seen a community as close-knit as what Ullin is, everybody is

like family. And that was one thing that drew me to it.” (Ullin, Religious Organization Representative)

Finally, another important reflection of social capital in the community that emerged from the interviews is the creation of avenues for social interaction by the leadership of the community, as well as informal organizations in the community. Key informants explained that the village has a strong history of making efforts to bring the community together for special events, and to encourage socialization through community-centered events sponsored by the local leadership.

“The town does a lot to try to get people together and bring people closer together. The town purchased new playground equipment up at the park. We have ball tournament up at the park. The churches have sunrise service, and they switch off every year between each other. That way they get together and do that and share that responsibility, so that brings the churches together. When we have the church socials and stuff like that we always invite all the churches. We really do try to bring the whole community together. Trick-or-treat now has become trunk-or-treat, and we sit on the parking lot and we bring in a bounce house, which the church usually does most of that or the churches do most close to that and they all set up there and organize that. We as a community and the town puts on the festival. But our churches are very involved in everything we do. We have a ritual, I guess you could say, where Santa Claus comes around every year at Christmas time and the fire department puts it on...Other fire departments come and there's sirens and there's just all kinds of things and he drives all over town. And then we go to the fire department and the kids can sit on Santa's lap and tell him what they want and we give

them treat bags. This has been going on since I was a kid.” (Ullin, Local Government Representative)

“I think for the most part, with our limits in being small, we do quite a bit. I think our community leaders are very effective for doing quite a bit for what we have ... Again, it's hard to be dissatisfied when it's such a quiet place. And for the most part, I can't really think of anything that just stands out with making me dissatisfied.” (Ullin, Religious Organization Representative)

In spite of the many desirable social attributes of Ullin, some key informants also expressed concern over the use of illicit drugs among certain segments of the population which was seen as a deviation from the social norms of the community.

“But there are certain places in town that you know have drugs. And it's a shame that we can't get those people arrested and get them out of town. That's my number one issue.”
(Ullin, Local Government Representative)

Human Capital

The interviews revealed both positive and negative perceptions of key informants on issues relating to human capital in Ullin. On the positive side, key informants expressed satisfaction with the small population of the community and the availability of skilled personnel to manage the local government and other essential services. Negative perceptions also focused on the shortfalls of the small and declining population of the community, as well as its changing demographic composition.

Key informants expressed various positive sentiments relating to the small population size of Ullin, and some were reluctant in embracing any potential changes in the current character of the community.

“It's a quiet place, so I wouldn't have any real complaints because I like it quiet, you know.” (Ullin, Community Services Representative)

“Is there such a thing as saying that people are content with the way things are?...They're happy with a small setting and they don't care if it gets big or not. And that's where most of the town is probably at.” (Ullin, Local Government Representative)

“One of the reasons I love my community so much is because I love small town atmosphere. And I love the quietness of it. And too much change might change that dynamic and I'm not sure I would like it too much ...” (Ullin, Religious Organization Representative)

Besides satisfaction with the small size of the community, key informants also expressed satisfaction with the effectiveness of personnel in charge of local government and the delivery of essential community services. The mayor's office and the police department were commended by a number of key informants.

“The mayor is working really hard trying to get the gymnasium fixed up so it's able to be used more often and people don't die of heat stroke in the summer. And we do try to work with the community on a lot of things. Our police officers do a very good job patrolling, not just the interstate, but in town as well. I think I would like to see them in town a little more often, but I understand that they can't be everywhere.” (Ullin, Community Support Services Representative)

“We've got more community involvement, I guess, as far as getting this [Village Hall] depot all done, and our next project is to fix up the gym down there...We've got a pretty good police department...” (Ullin, Local Government Representative)

Although key informants were satisfied with some aspects of the human capital in their community, a number of concerns were also expressed during the interviews. Some key informants perceived the population of the community to be stagnant while others perceived it to be declining, but both perspectives recognized the problem of out-migration due to decline in opportunities for jobs and income in the community.

“Anytime you lose jobs and people move out, it's kind of bad for your community. Like I said, we've averaged this population of eight hundred people⁴ for the last 10 or 15 years so we're not getting bigger, we're not getting smaller, we're just kind of staying the same. I guess for the most part people who live here in town, they got to go for 20 or 40 miles to their job. There's no jobs right here, hardly. So, people drive a-ways.” (Ullin, Local Government Representative)

“I've seen Ullin kind of, the population has decreased in the last 20 years. And I know that the sign showed an increase, when you come in, it says, "Welcome to Ullin, we've got 800 people." Well, that's not true...Yes, exaggerated, that's the word I'm looking for, because they're counting the people out there in the county jail and it's mostly full, so there's 200 people out there. Well, I don't really call them citizens of Ullin. But they're counted in the census...” (Ullin, Agriculture/ Big Creek Drainage Board Representative)

The high rate of out-migration among the working-age group in search of jobs elsewhere has left behind a population that is largely composed of retirees. In view of these trends, key informants mentioned the absence of entrepreneurial skills among the current residents as a key problem.

⁴ According to the U.S. Census Bureau, in the year 2000, the population for Ullin was 779. The 2010 census recorded the population as 463. Residents reported discrepancies regarding whether or not Ullin's official population includes those incarcerated at the Pulaski County Detention Center, a 240-bed facility.

“We've got people that are good people, that can work in a grocery store and do those kind of things but you're going to have to have somebody, an outsider or something, to come in that can [open a new business]...” (Ullin, Agriculture Representative)

“This last business that went out, the boys just didn't really know to run a business. And one of them was just too lazy to do it and wouldn't listen to anybody. When we tried to tell him something and give them ideas on how to, or tell them not to give credit, they gave credit anyway to certain people. And they went ahead and did it, so then they run themselves out of business.” (Ullin, Local Government Representative)

Another problem that key informants associated with the small and/or declining population of Ullin is the challenge of securing external funding for community development initiatives.

“By not having as big of a population, I think sometimes you suffer in maybe state resources, more grants, things like that, that help build communities up.” (Ullin, Religious Organization Representative)

Economic Capital

The interviews also revealed that the community of Ullin is faced with major economic challenges, such as widespread poverty, collapse of local businesses, and the resultant loss of non-farm sources of income and employment. However, it was also learned that a limited number of employment opportunities exist, and interventions to promote local economic development were being pursued.

Key informants mentioned the availability of a number of local businesses that serve as sources of income and employment for residents of Ullin as a positive attribute of the community. While most of these businesses are in the agricultural sector, the community has also

been able to attract some businesses in the service sector. A notable example that was mentioned during the interviews is Southern FS, a regional agriculture company whose services include seed, chemical, and fertilizer supply, data management and precision farming consulting, financing services, propane supply, fuel supply, livestock products, and other outdoor home care supply and services. The Ullin branch has at least ten full-time employees and several more seasonal and part-time workers. Another example is Masters Choice, an agricultural company specializing in seed corn, with an authorized dealer in Ullin. Although it employs fewer people, the company provides an important service to the local agriculture community, and benefits the community by generating revenue locally.

“Southern FS has employed a lot of people, and Masters Choice has, and it's helped out a lot. Southern FS has always been here, but they've finally expanded and got larger. Masters Choice has employed several down here, which is a business that came in to this area. We're really blessed with that. There's way more jobs down here for people who are able to work.” (Ullin, Agriculture Representative)

“We got businesses out there growing that we didn't have in the past. We got a hotel out here, and we also got the Tri-county jail⁵, which we didn't have in the past. They employ quite a few people...” (Ullin, Local Government Representative)

Another positive attribute of Ullin relating to economic capital is the availability of various financial support programs aimed at promoting the development of local businesses in the community. For instance, key informants mentioned that Ullin is an appointed tax increment

⁵ “Tri-county jail”, or “the jail” is a colloquialism for the Pulaski County Detention Center

financing (TIF)⁶ district, meaning that subsidies exist for the redevelopment and improvement of infrastructure and the promotion of new business ventures in the community. According to the Illinois Tax Increment Association, typical TIF projects include:

“The redevelopment of substandard, obsolete, or vacant buildings, financing general public infrastructure improvements, including streets, sewer, water, [etc.] in declining areas, cleaning up polluted areas, improving the viability of downtown business districts, providing infrastructure needed to develop a site for new industrial or commercial use, and rehabilitating historic properties.” (Illinois Tax Increment Association, 2018)

Additionally, the Illinois TIF Act authorizes use of funds for:

“The administration of a TIF redevelopment project, property acquisition, rehabilitation or renovation of existing public or private buildings, construction of public works or improvements, job training, relocation, financing costs, including interest assistance, studies, surveys and plans, marketing sites within the TIF, professional services, such as architectural, engineering, legal and financial planning, demolition and site preparation.” (Illinois Tax Increment Association, 2018)

Thus, TIF funds can be used for a wide array of projects and initiatives that could be beneficial to the community, especially in the downtown business district where I observed that several buildings seemed vacant or were in a state of disrepair.

“So we’ve got money available [to] try to help businesses grow and do things like that, and then we try to get the word out there that we have money available. I’d like to see

⁶ Tax increment financing, or TIF “calls for local taxing bodies to make a joint investment in the development or redevelopment of an area, with the intent that any short term gains be reinvested and leveraged so that all the taxing bodies will receive larger financial gains in the future. The funds for this investment do not come from current revenues, but from future tax revenues, not otherwise expected to occur. These new revenues are generated by increased public and private investment in identified, underperforming areas.” (Illinois Tax Increment Association, 2018)

more growth out towards the interstate, because there's a lot of property out there probably available sooner or later and where we could expand. We also got a TIF advisor. He tries to bring in new things. But in like anything, growth in a small town, you've got to have it or you die.” (Ullin, Local Government Representative)

Additionally, Ullin’s village council collaborates with Southern Five Regional Planning District and Development Commission (Southern Five), headquartered in Ullin. Southern Five’s services include loan fund programs, public infrastructure and housing rehabilitation programs, rural development loan and grant assistance, economic development assistance, technical planning assistance, a GIS lab, a Center for Regional Statistics, assistance with IDNR grant programs, funding for special projects, regional governmental coordination services, assistance with Delta Regional Authority funding, and funding for law enforcement, fire, and emergency services. Funds for these services are generally secured through state and federal grants, loans, and subsidies. Southern Five exclusively serves the southernmost five counties in Illinois, including Alexander, Johnson, Massac, Pulaski, and Union counties (Southern Five Regional Planning and Redevelopment Commission, 2018).

“We work with Southern Five to try to make improvements and get grants to do things and stuff like that. And usually, we can get community involvement. I mean there are some people that aren't going to get involved no matter what... You go through them [Southern Five] to get grants, like Federal grants or grants from different agencies to do things, because we got a grant for this and then we applied for a grant for the old gym to fix it up and different waterline projects. So they take care of applying for the grants, basically.” (Ullin, Local Government Representative)

Notwithstanding these positive aspects, the interviews also revealed that many more problems plague the economy of Ullin. There was a widespread perception among key informants of Ullin as a community in which poverty is pervasive and endemic.

“This is an impoverished area down here. Most of the senior citizens are on fixed incomes. There is a lot of single families down here, unfortunately. They are on state aid, federal aid, or some kind of aid. They don't have the funds... So, I think if there was more of an economical base and some prosperity going on, then I'd say this whole thing would turn around ... So I think it could turn around but it's going to take some kind of economical boost to put people back to work.” (Ullin, Agriculture/ Big Creek Drainage Board Representative)

“It's a small community, quiet, and you obviously might say it's little on the poor side... We just found out last week that our grocery store's closing. Now we're going to look for somebody to try to hopefully go in the grocery store business. So other than that we're holding our own.” (Ullin, Local Government Representative)

Key informants attributed the poverty problem in Ullin to the high levels of unemployment, resulting from the closure of local businesses and the difficulty of attracting new ones. One consequence of the loss of local jobs in the non-farm sectors is that residents increasingly have to commute longer distances to find work in larger settlements. The problem of unemployment in Ullin was compounded by the controversial 2013 closure of Tamms Correctional Center. Tamms Correctional Center (which operated as a 200-bed minimum security/ 500-bed closed maximum security, or “supermax” correctional facility) (Sundt, Castellano, & Briggs 2008), is located just six miles southwest of Ullin, and recruited most of its employees from nearby communities, including Ullin. According to some participants, the 2013

closure of the prison and subsequent loss of well-paying jobs drove a significant number of residents and their families to leave the town in order to seek employment elsewhere.

“But the problem is the lack of jobs in this area. We've had a lot of businesses going out. There's not much economic development. I worked at Tamms Correctional Center as a carpenter and it recently closed down. And a lot of other people had to move out of the area and I think that's the big ... concern that I have in this region is that there's nothing for our kids to do. There's no good jobs around, really around this area... But I think the big issue around here is that a lot of the private businesses in this area have gone out. But we just need something here, we need jobs. If you don't have jobs, you're not going to have people, period. And that's where we're lacking.” (Ullin, Long-term Resident)

“Unfortunately, there are no jobs here to keep the youth and the young here. And if they don't have a job, which there are not many jobs left, then they have to leave the area... As I said there are no jobs. There's no industry, there's nothing to keep the young people here. So they have to move on. That's what I don't like about it ... Agriculture's probably the biggest employer in the area, so if they don't work for a farmer, or a grain company... then they have to depend on a state job. Unfortunately... the ex-governor decided that he wanted to close this prison here that the state built, and promised would stay here and create economic development which, in my opinion, prisons ain't the way to do it. But you got to have a prison somewhere, and it worked out good here, and it provided a lot of employment for a lot of the local people in Pulaski, Alexander, Massac counties. So it was a shot in the arm that they badly needed. Now that it's gone, the people that remained, they either had to go to other state facilities away from here or they lost their job... So there's where your employment is in this area, or they have to go to Cape [Cape

Girardeau] and make a 30, 40-mile drive to Cape Girardeau, Missouri. On the east side, they tend to go to Paducah, which would be, again, a 30, 40, 50 mile drive over there ...”

(Ullin, Agriculture/ Big Creek Drainage Board Representative)

“The only issue that I see is, as far as I'm concerned, is the fact that we've lost a lot of our stores. We've lost a lot of business here in town which isn't our fault. I mean, we tried really hard to keep it and we have tried really hard to bring new businesses in. And we're still trying.” (Ullin, Local Government Representative)

Ullin’s inability to attract and retain businesses was also attributed to the high tax rates at the local and state levels that create an unfavorable business environment in the community.

“Well, I think a lot of it is that Illinois has such a high work comp rate⁷ and it's hard [for employers] to abide by the rules and regulations that the state has mandated. Also, high property taxes. Also, just the overall hoops that you have to jump through to start a business. That's the big factors. We are just taxed to death. Illinois just can't figure out that. You would think a state would want the lowest work comp rate, you would think that they would want to make it business friendly. And that's the biggest thing that's going on, not just in our region but in all of Illinois. They're taxing all these businesses across the state lines. And that's what's really got our area in trouble, is all the rules and regulations and the excessive taxes.” (Ullin, Long-term resident)

“Well, the town has just really went down, we've lost the grocery store, the tire store and the auto parts is, that gentleman is getting old probably going to retire, and [we] may

⁷ Workers’ Compensation insurance, or “workers’ comp”, is a state-mandated program requiring employers to make payments to an employee should they become injured or disabled while at work. As of 2016, Illinois employers paid an average of \$2.23 per \$100 of payroll as a workers’ compensation premium—21% higher than the median U.S. premium, and eighth-highest in the U.S. (Day, Manley, & Dotter, 2016)

lose that business.... We've run into ... real estate taxes on houses and stuff. It's really changing Pulaski County a lot. I mean, this is a poor county and Alexander is too, but it's just a poor county that can't fix what needs to be fixed.” (Ullin, Agriculture Representative)

While these high taxes discourage the relocation of new businesses into the community, key informants also noted that existing businesses are compelled to charge higher prices to stay afloat, and this ends up diverting demand to neighboring settlements that offer better prices, thus further dimming prospects for the viability of local businesses.

“Because so many of us have to go out of town for so many other things that we don't ... the prices have to be so high here on certain things for them to make a living. And it's hard for people to spend their money here.” (Ullin, Local Government Representative)

“And a lot of that is ... our gas tax, high, and all of our tax is high. People go across to Cape Girardeau and buy their gas and they end up buying their groceries over there, and that's where we go. Over by Karnak and Grand Chain, they go to Paducah, and when they're over there, they go out and eat. But until we do something about the taxes, we're not going to be able to tax our way out of this. Every time we add tax, people leave, jobs leave, and I don't know why they can't figure that out, that we can't just keep doing that and expect a different results. That's what really frustrates me, because we have so much to offer here.” (Ullin, Long-term Resident)

Natural Capital

With regard to natural capital, some key informants expressed satisfaction with the ecological conditions in the watershed and the benefits they provide to community members.

However, other key informants perceived that ecological conditions have declined over the years, and that opportunities for nature-based tourism were under-utilized.

As was noted at the beginning of this section, Ullin is situated near Cypress Creek National Wildlife Refuge, which is managed by the USFWS. For the most part, key informants regarded the natural areas near their community as valuable assets that provide various benefits. For instance, an annual event in Ullin, called “Cache River Days,” draws participants from within and outside the watershed and is centered on celebrating the benefits derived from the ecosystems in the watershed, including recreational opportunities, such as hunting, fishing, and wildlife viewing.

“The Cache River wetlands, you know, Ullin is pretty well-surrounded by it. For the most part, I think it kind of helps a little bit because people kind of relate to the location where it's at. I think it brings some tourism to our communities... It's provided outdoor opportunities, and they [community members] participate when we have Cache River Days you know, the canoe trips, and stuff like that.” (Ullin, Local Government representative)

However, there were other key informants who were unhappy with the current state of the ecosystems in the watershed. One long-term resident and advocate for the watershed explained that the watershed is now dramatically different from how it was in his childhood days, and expressed dissatisfaction with the current ecological condition of the Cache River and the wetlands.

“I'm fine, with the exception of the Cache River and the wetlands. It's terrible. And I'm probably the only one, or maybe one of the only ones, that believes that. Now, what is so upsetting is a lot of people comes down there from Chicago or other states. They get in

the canoe, and they go up to Cache, and they think it's great... They come from cities and they think it's wonderful down there when they see the trees, the water, the birds, and the bees and so forth and so on. Now there is still a lot there that is wonderful, but to me, it ain't. And the reason it ain't, I know what it supposed to be and they don't. So I am very unhappy with it.” (Ullin, Citizens Committee to Save the Cache Representative)

In a similar vein, other key informants also expressed dissatisfaction with the significant alterations in the hydrologic system of the watershed that have impeded drainage functions in the watershed, although the causes of these landscape transformations were not always clear to all key informants.

“Any time somebody throws a cup of water in the creek, we flood. Of course I can even remember when Cache was a pretty good size ditch. Used to run motor boats up and down. Wasn't nothing to throw a 12-foot, 14-foot Johnboat up in it with a trolling motor and go. You'd be good to get up and down now with the road open unless the water's up. Now, what caused that? I don't know.” (Ullin, Law Enforcement Representative)

“Just looking back, I have got some old pictures that showed the Cache, that was a couple hundred, well 100 foot wide, I mean it was big. They actually ran big boats that carried logs up the Cache, and you can't even hardly get a canoe or a Johnboat down in there now. I mean it is that big of a difference ... Things are sort of turning into a nightmare.” (Ullin, Agriculture Representative)

“Cache, when I was growing up, it used to have current go through it. It was a really nice river ... It was a lot bigger, it wasn't silted in ... It's more like a swamp now than it is a river ... I don't have a problem with swamps, but there's no reason why you can't have both if you understand what I mean.” (Ullin, Long-term resident)

Other key informants also expressed the view that the potential of the watershed as a source of tourism was not being utilized to the fullest. The lack of development of essential tourism infrastructure was mentioned as a cause of this under-utilization.

“Well, we have such beautiful landscape and wildlife and stuff, I would like to see them touch a little bit more on that ... We've got the refuge and a lot of government land around here, that they couldn't develop that and maybe put some nice cabins on?... If we can't get jobs, the only other thing we have is the refuge area and wildlife and stuff. And if we don't make it more business-friendly where we can get production jobs, then we're going to have to rely on our natural resources because unfortunately, that's about all we got.” (Ullin, long-term resident)

Physical Capital

The analysis of key informants' responses relating to community infrastructure revealed both positive and negative community attributes. On the positive side, key informants mentioned recent progress in attracting various service providers to the community, as well as efforts by the local leadership to renovate existing infrastructure. Negative attributes mentioned by key informants include the continued deterioration of some types of community infrastructure, such as roads, the relocation of some service providers, and the absence of infrastructure for dealing with increased threat from floods.

Key informants described Ullin as a relatively small rural community which suggests that the community will have a limited ability to support social and technical infrastructure. In spite of this inherent limitation, it was learned that progress is being made in the attraction of various service providers to the community. Given that community members frequently have to travel to

other settlements for various services, the attraction of providers of essential services should contribute to the well-being of community members.

“And we've got a gas station out here, finally, and a place to eat, but we were for years without no place, no restaurant here...” (Ullin, Agriculture Representative)

“We have grown some a little bit. You know, we got the jail. We got Tri-County [jail], we've got the assisted living up here, Cache Valley apartments. So you know ... there's two things we have grown in but yet, there's always room for improvement.” (Ullin, Local Government Representative)

Other key informants expressed satisfaction with the quality of water delivered to Ullin as a result of improvements in the community's water supply system.

“I've seen the development here in Ullin, I've seen the water line projects and I've seen better water come in to Ullin than what they had before, coming in through South Water. I haven't seen too many changes in any other infrastructure than that.” (Ullin, Law Enforcement/Education Representative)

Additionally, key informants mentioned the beautification of the community as a result of ongoing efforts to maintain existing community infrastructure, particularly housing.

“I mean, the city has cleaned uptown with part of the housing back there that was junk, people moved out and abandoned, they're cleaning that up, which is really making the town look great compared to the way it was. It was skid row whenever you went through part of it. And so, they've done a lot of work that way, but they're having to beg, borrow and steal to be able to do that.” (Ullin, Agriculture Representative)

On the other hand, several key informants mentioned the decline in various community services, such as shopping centers and the local post office. For instance, research participants explained that the only grocery store in town had been under multiple ownerships over the years, and that at the time of the interviews, it had recently closed once again. The lack of a grocery store in the community implies that residents have to travel a longer distance to purchase food supplies. This poses an even greater challenge to those without the ability to easily travel outside of the community.

“The grocery store itself has changed hands several times ... The man that originally built the place ... they gave some of the poor people credit and stuff, which was pretty cool... But it was just a nice thing to do and people can't do that anymore, so the last guy that had it pretty well couldn't do it and he didn't last very long. It's one of those things that just don't happen.” (Ullin, Agriculture Representative)

“In my little town, it used to have a grocery store. Now it don't. It used to have a post office. Now it doesn't.” (Ullin, Community Services Representative)

Other key informants also expressed dissatisfaction with some aspects of the community's infrastructure. For instance, not all respondents were satisfied with current housing situation in the community. One key informant mentioned that some properties, specifically rental homes, were not well-kept, as they are typically managed by absentee landlords.

“Some of the homes are landlord-tenant operations, so the tenants just try to make the rent payment and pay the electricity. The landlord is usually an absentee, doesn't live here so he's not worried about it.” (Ullin, Agriculture/ Big Creek Drainage Board Representative)

The deterioration of the community's roads and drainage infrastructure, a problem that was attributed to the inadequacy of funding, was also a source of frustration for some key informants.

“As for the drainage part of it, we're really going downhill big time, I feel like ... We've got problems with our roads and, like I said, in places they're fixing them and coming up with enough cash to do all that, but it's, we're just steadily going downhill.” (Ullin, Agriculture Representative)

Strong opinions were also expressed by key informants over the inadequacy of community infrastructure for disaster management.

“We have a generator, but it's not hooked up... We need to get that fixed so that we have power at least at the fire department to house people so they can stay warm ... Our fire department needs equipment, newer equipment. I'd like to see our fire department get a new tanker, something that can hold more water, something that moves 55 mph.” (Ullin, Local Government Representative)

The need for essential infrastructure for disaster preparedness is particularly pressing in the area of flood risk management which is one of the most significant problems facing the community. One of the research participants shared aerial photographs during the interview to help illustrate the increasing frequency and severity of flooding in the community in recent decades. While there were some instances where no level of infrastructure or flood mitigation could have prevented the property damage that ensued, other instances were a result of infrastructure failure.

“Since 2008, we've had three floods. For me here, that actually got into my house and actually the basement... I've been here since '64, since I was a kid, we've never had water

in the house, period: in the basement or anything. Then 2008 comes along and then we've had, that was kind of like a man-made deal. We had a lot of rain, but a guy had a bridge north of town that actually floated across and got in front of the railroad track bridge, and blocked the water flow there. And it all came towards the south, toward us. And I don't think that would've necessarily happened if that bridge hadn't come loose and blocked up the flow of the water under the railroad track. But then we had another one in '11 that was uncontrollable. Which, I don't care what kind of drainage you had, you wouldn't have gotten rid of it. That was just a bad flood for us in 2011. Then '16 comes along and...there's the front of the house up there, see, [water is] in the basement, all around, everywhere... But looking at this picture, this should never have happened. This was a six-inch downpour of rain that we've had a hundred times in the last 50 years here. Never had water up here like this ever again, and never in the basement. Never even close. In '86, we had 14 inches of rain in 24 hours. And I never had no water here. I'm sure this bottom flooded, but never in the house, nowhere around the ridge. But the drainage is just stopped...And like I said, there's no current out there. You could throw a paper towel out there and it won't flow anywhere. Whenever the water gets up and it should be flowing towards the west really well, instead it's white-capping underneath this bridge here. But in '07 and '11, it went over the highway, I mean it was that deep... And that's a fact of the town, well-known and everything.” (Ullin, Agriculture Representative)

Community Dynamics

This section presents data on key informants' perceptions on existing threats and opportunities, as well as the ability of the community to deal with various forces of change. The

data is organized under the following categories: community threats; community opportunities; and community adaptive capacity.

Community Threats

During the interviews, key informants were asked about potential threats to the community of Ullin. The results showed that flooding was the topmost concern of most research participants. Other respondents also highlighted the unpredictable nature of the multiple drivers of change that the community is constantly exposed to, including climatic and non-climatic threats.

During the interviews, almost all of the research participants mentioned flooding as their first or main concern regarding the threats the community has faced or will likely face in the future.

“Well, I think that one of the threats that we face around here, particularly in Ullin is a flooding issue. We've had that in the past, and that's one thing that I would like to see the wetland people [CRWJVP], and the drainage district to work together a little bit better along with the government in town to ensure that we can control the floodwater. Ullin really has to watch about how the water situation is, and we've got another business here in town that houses the elderly assisted living style, and they've been flooded a few times and whatnot. But that's the environmental issue that I think that affects, probably, this area more than anything.” (Ullin, Long-term resident)

Some key informants attributed the increased flooding frequency and severity in Ullin to poor drainage in the areas surrounding the Lower Cache River near Ullin. Respondents noted that the Lower Cache River and its tributaries are unable to efficiently drain water from large precipitation events due to siltation and overgrowth of vegetation along the banks of the river.

Others also associated the flood vulnerability of the community to the topographic features of the region.

“Ullin has a water problem and it comes from Mill Creek. And Mill Creek is a drainage area that is larger than Big Creek and it's larger than Cypress Creek. And most people don't realize that Mill Creek is bigger than either one of them. But it has us surrounded by... 340, 350 [feet off] elevation above sea level.⁸ These elevations of these hills and terrain can reach up to 700, 800 feet...So when you get an 8 to 12-inch rain in that kind of environment, and it just rushes off of these hills, it gets into the bottoms and then it spreads out and there's a lot of areas where it can't get out quick enough... So, the water stacks up. When it stacks up, then it starts overland flooding and it floods Ullin. And this has happened many times over the last 40 years and then in '08 and '11 was two of the latest ones. In '08 was probably the worst... it got into the senior citizens' assisted living building. And the building went underwater anywhere from 12 inches to 18-24 inches...And that night that they were evacuating them, I had never seen water in Ullin like that. And I hope I never see it again like that. (Ullin, Agriculture/ Big Creek Drainage District Representative)

Beyond the specific focus on floods, other key informants also expressed the view that the community has historically been exposed to threats from multiple sources and although there is always the likelihood of these threats occurring, the future is unpredictable.

⁸ The Cache River basin topography ranges in elevation from 890 feet mean sea level to 280 feet mean sea level at the lowest point. According to the Illinois state water survey of the Cache River basin, many areas in the watershed have relief of several hundred feet or more. The upper portion of the watershed has the steepest slopes, with the lower part of the watershed having little to no relief. Thus, upland runoff moves very quickly into the river valleys and bottomland areas, which in turn drain the water relatively slowly (Demissie et al., 1990).

“There's always a possibility for natural threats. Our community has suffered natural threats in the past whether it would be major snow storms or wind storms. Flooding, we had a few floods here in recent years. So you've always got those natural threats... As far as public safety threats, things like that, I don't really foresee anything on the horizon but there's always the potential in a volatile world that we live in that there could be threats.” (Ullin, Religious Organization Representative)

When asked about the effect that climate change has had or will have on the Ullin community and the ecosystems that support the community, few participants believed that there were any climate-related threats to the community. However, some did attribute unusual weather patterns to climate change, and believed that climate change impacts may interact with other factors to compound the problems faced by the community.

“Climate change is having a problem with every place. We don't really have any rain unless it pours. And, yes, it has a big effect on that. We used to, when I was a kid, wasn't nothing to have snows all winter long, several of them. And look, we haven't even had one this year. And it's almost t-shirt weather out here today. And this is the 31st of January. It's just terrible. It's just one extreme to another. Yes, it does play a factor on things. But in the same respect, with the drainage ... yes, it causes floods like we had in '11. But we were sitting here in '86 like I was explaining, having 14 inches in 24 hours, and no flooding. Here, we had it north of town, but that was it. We didn't have none here, and look, six inch rain. I just showed you pictures, has got us water in here. So the two of them combined is really kicking our tail.” (Ullin, Agriculture Representative)

Community Opportunities

On the question of opportunities for the future development of the community, some research participants identified various potentials for the development of the community, including the promotion of nature-based tourism. However, the responses also indicated that these potentials remain under-utilized. Other key informants were less optimistic about the availability of viable options for community development.

One of the opportunities for community development that was mentioned by key informants is the TIF, a funding mechanism for attracting businesses to the community. Research participants, however, admitted that the local leadership does not always advertise the available TIF funding as effectively as they should, and that many people do not understand the stipulations involved with it. As a result, this funding opportunity for the development of local businesses in the community remains largely under-utilized.

“Well the only thing we can attract from a city standpoint is, like I said, we do have the TIF money available which we can, we can look at different ways on TIF money. We can loan it to them, where they pay it back in a certain amount of time, we can actually give them the money, where they don't have to pay it back if they meet certain conditions. TIF is all about trying to bring businesses to your community and upgrade your community. That's what it's all about. So we do have that, we do have that in place. I think one thing with TIF is that a lot of people don't understand how it works and therefore they're scared. They're scared to try it...maybe we don't promote it like we should promote it, but we do have it available.” (Ullin, Local Government Representative)

Another opportunity that was identified by key informants is the community's proximity to the Interstate Highway network. Some key informants expressed the view that this opportunity

is currently not being utilized to the community's advantage, and that the physical expansion of the community toward Interstate 57 could bring various benefits to the community.

"I think it refers back to the interstate. I think if you drive down I-57 now and you hit Mount Vernon, most people don't want to stop at Mount Vernon. They go on to a little town called Ina south of it because it's easier to get in and out. And you're starting to see a lot of growth in Ina and you're starting to see a lot of infrastructure and buildup in Ina. And I think that with the growth in Marion, Illinois, your next closest town close to the interstate is Charleston, Missouri. And that leaves Ullin right on the interstate. And I think if we can get that area built up then I think we can bring in additional jobs. I think we can bring in more revenue to do more infrastructure here around Ullin and possibly bring more community things to Ullin. That would possibly help draw people in, not to mention it would also support our school district as well." (Ullin, Law Enforcement/Education Representative)

Key informants also identified nature-based tourism as another under-utilized opportunity for the development of the community due to the relative isolation of the southern Illinois region. In this regard, some suggested the need for enhancing the accessibility of the region through improved transportation networks connecting the region to urban centers, such as Cape Girardeau, Missouri and Paducah, Kentucky.

"In the state of Illinois, we're kind [of] out here by ourselves. The lower part, especially the farther south you go, you're kind of just out there. And we have so much. It really, really, bothers me that you can go from Cape Girardeau, Missouri across through southern Illinois, where there's nothing, and then go to Paducah. Now, that tells me we should be the hub between those states. And by us not being the hub, that tells you that

our legislators and State mainly is dropping the ball. We have beautiful landscape, we have wildlife and everything that people find very attractive, but I think our legislators have failed us in promoting this...You get a lot of people that was talking about bringing the road across from Cape Girardeau or tying it, [interstate] 55 into [interstate] 24, which would really, really help this area. And there's a lot of people on both sides that say, 'Okay. We don't want you come through the wetlands.' Well, there has to be a compromise. And I think there could be. You may have to give a little to get a little bit more. And if everybody would work together and try to work on getting that done it would really tie in a lot of traffic into our resources that we have." (Ullin, Long-term Resident)

There were, however, other key informants who expressed pessimism about the future of the community based on observed trends of declining community conditions over the past few decades.

"I don't know that I see opportunities much more for business growth that would increase its economy. It's always possible, but you just don't, I don't see that happening. There's more of a drawing away from small town industry than there is coming, even though we've had a little bit of a shift in that way. So I don't know if there's much in the economy ways." (Ullin, Religious Organization Representative)

"There's not a whole lot of opportunities. I don't like to say that but there's not, really. Like I said, more people here will look for a job outside this area." (Ullin, Local Government Representative)

Community Adaptive Capacity

During the interviews, key informants were asked about their perceptions of the ability of the community of Ullin to mobilize the needed resources to act collectively in response to various threats and to take advantage of opportunities for enhancing the well-being of community members. The responses indicated that key informants associated the incidence of collective action and the role of religious organizations with community adaptive capacity. However, they also mentioned the limited community resources and the culture of reactive planning as constraints to the community's adaptive capacity.

With regard to the manifestations of adaptive capacity, key informants mentioned the spirit of volunteerism that enables community collective action to address various needs.

“Yeah we're pretty resilient. We've had people come together as a community to keep, to help defray it [effects of threats to the community], to get through it. We have a volunteer fire department, which you know volunteers, volunteer rescue units. So we have people in a community who volunteer time for different things. So yeah, we're pretty resilient if we have to be.” (Ullin, Local Government Representative)

Some key informants also mentioned shared religious affiliation among community members as a source of community cohesion. Closely related to this, religious organizations were mentioned as an essential component of the institutional mechanisms for community response to various events.

“I think the people pull together and make it so, absolutely. I mean if somebody has a problem, we help them and take care of the problem, absolutely. Yeah, we're resilient, every one of us. We believe in Christ, that right there is enough.” (Ullin, Local Government Representative)

“I think that we do a good job. In fact, our church serves as an evacuation center for people that are being flooded out or have had damage to their homes or something like that... How are we prepared to handle it? We actually have a contingency plan. We try to consider it, we have some leaders in the church that we talk to and we talk about and, and try to regularly meet... Occasionally meet is probably a better word, to just talk about what would we do in this situation, especially when we hear of something happening outside of our community. And we try to stay as prepared as we can be.”
(Ullin, Religious Organization Representative)

Other key informants gave a more measured response, depicting Ullin as a community with the capacity to cope with some events but lacking the capacity for long-term responses that might require the mobilization of significant resources on the part of community members. The lack of required resources for adapting to change is reflective of the declining socio-economic conditions in the community as depicted in previous sections of this chapter.

“There's a lot of good people in town. We have a lot of good knowledgeable people in town that always comes out in disaster or problems that help for nothing. There's a lot of people that does that. And we're blessed with that fact, and as for change or long-term, we're good at fixing things, but, we just don't have the resources and the money to be able to fix things for long term. Well, we had a, it wasn't a tornado, but it was straight line winds come through here in the 80s, just wiped out not houses but trees. Huge trees just covered streets here. Almost everybody and their uncle were in there to fix that and went back in business again within two days, with basically no help except for the electrical companies who put us back together there. But yeah, short-term things, we've got the ability to do things like that. But for long term, fix things permanently, and

finances to do that, we don't have that in this part of the area... Nobody can be totally prepared. We can try. Just like what we've done all summer. I know the water table has changed, and what's happening. We put in different drains here at the house this summer in preparation, where we can put a levee around the backside of the house. I'm just fortunate at this time that I can afford to do something like that because a lot of people can't." (Ullin, Agriculture Representative)

Closely related to the lack of resources for long-term responses to major events, key informants also noted that another limitation in the adaptive capacity of the community is the tendency for reactive rather than proactive responses to threats.

"There's not a whole lot of preparation that goes in ahead of time. It's kind of a wait attitude, and once the event happens, then the community, well, then tries to react and do the best they can. And I have to brag on the fire department, and they're limited in their funds, too, but when something like that does occur, they do the best they can as quick as they can. But they're kind of leading from behind and they can't really make preparations ahead of time. They have to wait until something happens and then react, and that's not always a good situation to be in." (Ullin, Agriculture/ Big Creek Drainage Board Representative)

Community Participation

This section presents data relating to key informants' responses to questions on the extent of community involvement in the management activities of the CRWJVP, as well as the barriers associated with the participation process. Similar to the chapter on Karnak, the data on Ullin will be organized under the following: knowledge; motivation; involvement; and barriers to participation.

Knowledge

The analysis of the interview data revealed that some key informants were moderately knowledgeable about the watershed and the CRWJVP while other key informants admitted to knowing very little about the partnership. It also emerged that knowledge about the CRWJVP seemed to vary among members of the wider community.

During the interviews, some key informants, including a local government representative, displayed some level of awareness about various aspects of the CRWJVP, such as the membership, management programs and challenges faced by the partnership.

“Well I know the partnership has went with Fish and Wildlife [USFWS] and with The Nature Conservancy, that's their partnership. They try to put things together that they both can live with. And that's how they do it. I've been to some of their meetings. So I know a little bit about it. I'd say they try to work together on solving problems.” (Ullin, Local Government Representative)

“I don't know that much about it, but I know that they [CRWJVP] do, from what I understand, they do work and try to ensure that they're doing the best thing they can. I realize that funding is an issue, and I know a few of them that worked there ... If you talk to them, I think they're going to probably tell you the same thing. The biggest thing, the biggest problem they have, is with the drainage district.” (Ullin, Long-term resident)

However, other key informants demonstrated a limited level of awareness about the CRWJVP and its management efforts in the watershed.

“It's a fun place to take the grandkids, but other than that the real serious stuff about it, I don't know enough about it to talk about it...Most of that I don't understand. You know, I've been in on meetings and people having their opinions about everything, but I guess

for that you're probably talking to the wrong person.” (Ullin, Local Government Representative)

“I know very little about it. I just know who the players are and what I hear they tried to do.” (Ullin, Agriculture/ Big Creek Drainage Board Representative)

Consistent with the variation in level of knowledge held by key informants, there was also the recognition among key informants that knowledge about the CRWJVP may not be widespread among residents of Ullin. One key informant noted that the lack of knowledge about the watershed was the result of the lack of effort on the part of some community members to learn about their local environment.

“I wonder how many people are actually aware of what all the Cache River and the wetlands has to offer or what all is even going on. I don't know how many in the community actually realize they live in the Cache River Wetlands area... I think the information is out there, I don't think there's a hidden piece of nature out here that nobody knows about. Pretty much, everybody has the opportunity to at least know what's going on. All that information is readily available if people just want to find it.” (Ullin, Religious Organization Representative)

Motivation

In an effort to explore the motivations driving community involvement in the management of the watershed, key informants were asked about the meanings they associate with the watershed. Responses ranged from the value of the watershed as a source of recreation and tourism, to its value as a symbol of community history and identity.

To some key informants, the Cache River Watershed is valuable as a source of local recreational opportunities. By providing opportunities for local residents to undertake

recreational activities, such as fishing and hunting, the watershed also serves as an arena for social interaction among families and other community members.

“I have, as a father, have enjoyed taking my son and my daughter at times to certain areas where there's watch points and areas where you can go and look and we've walked those paths and looked out through the scenic views and talked about things. So it's had a positive impact, I feel, on our community.” (Ullin, Religious Organization Representative)

“It's a fun place to take the grandkids, but other than that, the real serious stuff about it, I don't know enough about it to talk about it.” (Ullin, Local Government Representative)

Closely related to its role in local recreational pursuits, the watershed was also associated with opportunities for nature-based tourism promotion which entails the attraction of people from distant geographic and economic regions to the southern Illinois region. Key informants, however, noted that the tourism potential of the watershed was yet to be developed to its full potential.

“I think it has served some really good purposes for nature and even some for tourism ... Here at the church, we don't necessarily benefit directly from tourism as far as people or anything, but I do hear of people coming to this area just for a view of the Cache River and the wetlands and to see some of it.” (Ullin, Religious Organization Representative)

For other key informants, the Cache River is an iconic part of the community's identity which can evoke nostalgia about the community's history. The expression of these sentiments suggests that the Cache River plays a key role in developing special bonds between community members and their local environment. These special bonds may serve as sources of motivation for community action beyond narrow economic concerns.

“Well, it's the main icon of our whole town. It runs right through our town. It's what we have our festival around. Cache River was a big deal. They used to float logs down it. It was even bigger than what it is now. I can remember sitting on the bank, fishing out of it when I was a kid. It brings back a lot of memories for me...” (Ullin, Local Government Representative)

Involvement

Key informants were also asked about the extent to which members of the Ullin community were involved in the management activities of the CRWJVP. The results showed that community members were involved in diverse forms, including participation in outreach activities, such as local festivals, access to information, and participation in restoration efforts. Notably, a missing component here is community involvement in the decision-making process, without which meaningful community participation is unlikely to be realized. It was also learned that not all key informants or community members are involved in the management activities of the CRWJVP.

Key informants' responses indicated that community members were actively involved in various outreach events organized by the CRWJVP to create broad-based awareness about the watershed, such as Cache River Days.

“I've seen, of course, during Cache River Days here in Ullin, DNR [IDNR] will come into the community and they will bring reptiles and furs and you name it from different animals and species in this area, you know, put them on display for people to see. I've seen them draw people in...” (Ullin, Law Enforcement/Education Representative)

Besides the organization of these festivals, the interviews also revealed that other mechanisms for information-sharing by the CRWJVP exist through which community members interact with members of the organization and participate in the management of the watershed.

“I've been up to the main [USFWS] office at Shawnee College, and have received maps for hunting and things like that. And before, if I wanted to go canoeing, they were always available for educating you on the rules and regulations and areas to go to. So I've seen them be very inviting, I've never had any issues with any of those organization. And they've been at the schools as well, so that's another good thing.” (Ullin, Law Enforcement/Education Representative)

Moreover, it was also learned that some community members have the opportunity to actively participate in various restoration efforts being undertaken by the CRWJVP, such as the planting of trees along the corridor of the Cache River.

“I've got three sons in this area and ever since they were little we would go out and collect acorns ... It was sponsored by DNR [IDNR] and so I've seen a lot of those activities, where they would draw the youth in, the parents in. I know my wife and I both went out with the kids, and they would collect big bags of acorns and they would take them back and they would plant them and that's how they ... that's how they planted a lot of these young trees. So it was my understanding if they planted 50 acorns they may get four trees out of it so that's why it was important. So I've seen them bring the community together in those aspects and it'd be very positive...” (Ullin, Law Enforcement/Education Representative)

There were, however, some research participants who noted that not all community members are involved in the management activities of the CRWJVP.

“There's certain people that are very involved, and there's other people like me that don't have a clue what they're talking about. One issue has been that the Lower Cache [Lower Cache River] needs to be cleaned out because [of] the flooding issues. But I'm not real involved in it, but the ones that are would talk your ear off.” (Ullin, Local Government Representative)

Participation Barriers

Key informants were also asked about the factors inhibiting community involvement in the management activities of the CRWJVP. The results indicated that a lack of communication and publicity about CRWJVP management activities, lack of interest from some segments of the community, and animosity between community members and the CRWJVP are some of the key barriers to participation.

Some key informants identified the lack of awareness about CRWJVP meetings and management efforts as a barrier to community participation. The problem was attributed to the inadequacy of efforts on the part of the CRWJVP to share relevant information and to seek stakeholder input in the management of the watershed. One key informant perceived the gap in communication as an intentional act on the part of the CRWJVP to avoid confrontation or conflict with the Big Creek Drainage District board or other interest groups.

“I don't think the people are involved at all, and I think JVP [CRWJVP] doesn't want the local people involved. You've got to know when they're meeting and where the meeting's at. They make absolutely no public announcements about it. They have no news release about it. And at the drainage meeting when their members show up, if I don't ask when

the next meeting is or what happened at the last meeting, we never know nothing.” (Ullin, Agriculture/ Big Creek Drainage Board Representative)

Another barrier that emerged from the data is the lack of interest among some community members in CRWJVP management efforts. The lack of community interest may imply that community members do not perceive that participation in the CRWJVP management programs will generate benefits to the community. However, one key informant related the problem to a general decline in civic engagement among community residents.

“As far as community's interest, I think it's out of sight, out of mind ... What I've noticed over the last 10 or so years is that people, if it don't affect you, they don't want to get involved. People don't want to volunteer and do things like that hardly anymore. So if it don't affect them, they're not doing it. That's the way I feel.” (Ullin, Local Government Representative)

Closely related to the lack of interest discussed above, other key informants highlighted the unfavorable relationship between the CRWJVP and some segments of the community as a barrier to community participation. These unfavorable relationships were attributed to the adverse impacts of past CRWJVP management actions on some community members, particularly farmers. The acquisition of private lands by the CRWJVP was mentioned as a major source of grievance among some community members.

“Lot of it is hard feelings because, even I for years, I mean, I was ticked at the government. I lost a farm because I still say if they hadn't been trying to build this refuge, I'd be sitting pretty good right now. And there's a lot of farmers that went out of business, or got put set back so far that they're still hurting trying to come out of it. Even though it's been tremendously good for the last fifteen years, but some of them are just now

starting out of that last forty years, or thirty years whatever it is, are just now starting to be able to breathe a little bit. That makes it tough. It's hard to swallow when you lose everything that you love, and worked for your whole life.” (Ullin, Law Enforcement Representative)

Some key informants also expressed concern about the restricted access to parts of the watershed, such as the Cypress Creek National Wildlife Refuge and the wetlands as a barrier to participation, as it limits perceived community benefits. It appears these restrictions may have adversely impacted community members’ interest in, as well as opportunities for participating in CRWJVP management efforts. One research participant stated that enhancing access to the refuge, in particular, could bolster interest in the refuge and most likely create more support from the community.

“I'm a hunter ... the biggest, I think, issue I have with it, with the refuge part is that you don't have access to it. You know you've got a few spots that you see. But I think that they could promote it a little bit better that if they keep it a sanctuary that allow different areas that people could actually see more of it. And I know that takes staff and whatnot. But I think they could have a little bit more of this land to where you could actually go out and see more of wildlife and stuff like that... I think there is some things they could do. I mean, I realize they're limited in resources.” (Ullin, Long-term resident)

Outcomes

In this section, results on key informants’ perspectives on the community level impacts of the CRWJVP and its management actions in the watershed are presented. The results comprise both negative and positive consequences of the CRWJVP, and are presented using the capital assets framework as was used to describe the community’s context and setting.

Social Capital Outcomes

Key informants' perspectives on the impacts of the CRWJVP on the quality of social relations in the community of Ullin were varied. While some key informants highlighted the potential for improved social relations among community members as a result of nature-based recreational opportunities provided through the activities of the CRWJVP, as well as improved relations between the community and the CRWJVP, others also mentioned various forms of conflicts between the community and the CRWJVP resulting from land acquisitions, drainage management, and the overall resource management approach of the CRWJVP.

Some of the research participants mentioned that the management efforts of the CRWJVP have contributed to the improvement of social relations among community members, particularly those interested in outdoor recreational activities, such as fishing and hunting. The pursuit of these recreational activities promotes interactions among community members, and the restoration of ecosystems in the watershed by the CRWJVP provides opportunities for such interactions to occur.

“A lot of families hunt around the area. That's a social issue. There's a lot of people that use that to take their kid hunting and socialize them. I mean, that's memories ... for a lot of hunters. And a lot of hunters come in here all the time from out-of-state, and they're hunting the ground that the state owns and is joint venture owned. I mean, that's very, very important. Any time you get a bunch of guys together, or girls are even hunting, bow hunting and stuff like that, I mean, that's a social issue.” (Ullin, Long-term resident)

Some key informants also expressed the view that a healthy relationship exists between the Ullin community and the CRWJVP, as is reflected in the joint organization of various events that bring residents together, such as Cache River Days.

“We worked hand in hand with Nature Conservancy [TNC] out there at the colleges, and matter of fact we got an event this weekend called Cache River Days, and they come in every year and sponsor canoe trips and all that stuff help us a lot so we know we work a pretty good partnership with the refuge. At least Ullin does.” (Ullin, Local Government Representative)

Other responses on the community’s relationship with the CRWJVP were nuanced. Some key informants expressed satisfaction with some aspects of the interaction, and dissatisfaction with others. There were also other key informants who held positive perceptions about some members of the CRWJVP, and negative perceptions about others.

“Yeah, sometimes there's some tough communication there, but, all in all, they [Ullin and the CRWJVP] get along fairly well, you know what I mean ... ” (Ullin, Agriculture Representative)

“I would rather not speak too much on Nature Conservancy [TNC] because I'm just, I didn't have too good of dealings with them...Fish and Wildlife [USFWS], they treated me well.” (Ullin, Law Enforcement Representative)

There were also key informants who expressed negative perceptions about the relationship between the community and the CRWJVP as a whole. One source of this discordance is the history of conflicts surrounding land acquisition by CRWJVP members for their restoration initiatives.

“The only thing I can say is that ... a few years ago, I had some property for sale and I talked to IDNR. They approached me about wanting to buy it and of course, they were wanting to buy it at a lot lower rate than what the actual value of it was worth. And that aspect, if at the onset of this, if any farmers lost any land or were forced to give any of it up, I think that they may have a better opinion or a different opinion on it than what I would have. I don't know of any cases other than just listening to some of the negativity in the beginning.” (Ullin, Law Enforcement/Education Representative)

Conflicts between the CRWJVP and the local Drainage District over the management of water resources were also identified by key informants as sources of marred relationships between the community and the CRWJVP. These conflicts have also involved farmers who are directly affected by the management decisions of the CRWJVP and the Drainage District.

“Things would be a lot better if there wasn't so much dissension between the drainage district and [the CRWJVP], and allow them to do what's best. I mean, there's got to be a compromise, I understand that. But the people that's making the decision ought to have some education or expertise on the issues, you understand what I mean?” (Ullin, Long-term resident)

“I'm sure they've had snags along the way with probably farmers. While I'm not involved with farmers, I'm involved in other aspects of it. So like I said, I know the drainage district which is involved with a bunch of farmers. I know they've had their ups and downs with them on the drainage thing over that big ditch over there in Karnak which I'm sure you're probably aware of that story. So you know I learned a long time ago, you learn how to give and take, and if you can't do that you don't need be in any kind of business because that's part of it.” (Ullin, Local Government Representative)

Other conflicts between the CRWJVP and the Ullin community centered on differences in resource management preferences. One key informant explained that restoration efforts in the watershed was originally started by local conservation interests who later on invited some of the current members of the CRWJVP as partners in the conservation of the watershed. However, conflicts soon ensued due to differences in management approaches between the external actors and the local conservationists.

“It took us three years to get [CRWJVP members] involved in purchasing the wetlands in order to help us save it [the Cache River Wetlands]... And they started buying the pieces of it. Now the main purpose was to put it in an ownership that didn't want to clear it up and destroy it. Well, that worked okay for a while... Pretty soon we realized what the state was doing wasn't helping to save it. They were the ones that we was fighting to try to save it. Now that don't make sense, but that's the way it happened. We was fighting the drainage people, the farmers, agriculture people that wanted to drain it and destroy it. To stop that, we get somebody that we think will help us save the rest of it. And it turned out this: the opposite...” (Ullin, Citizens Committee to Save the Cache Representative)

Human Capital Outcomes

With regard to the impacts of the CRWJVP on human capital, key informants' responses highlighted the negative impacts of CRWJVP programs on the Ullin community, including population instability and the under-utilization of local knowledge.

Some key informants associated the declining population of the Ullin community with the displacement of farming families as a result of the large scale acquisition of farmlands in the watershed by the CRWJVP for ecological restoration purposes.

“They [CRWJVP] are buying up all the [privately-owned] land so people aren't here anymore” (Ullin, Citizens Committee to Save the Cache Representative)

“We know that they have distorted the tax roll, and they've shrunk it. They've shrunk the population so they've shrunk the schools in this area, their populations.” (Ullin, Agriculture/ Big Creek Drainage Board Representative)

The interviews also revealed that the acquisition of private lands from farmers in the watershed by the CRWJVP may have had an adverse impact on the utilization of local knowledge. Some key informants expressed the view that the private landowners were more familiar with the historical ecological conditions of the watershed, and were more likely to manage it sustainably. With the change in land ownership, land management authority has been taken over by the CRWJVP that may not possess the requisite local knowledge long-term residents in the watershed have accumulated by learning to live with the natural features of the land.

“Back prior to 1983, the whole system was private-owned, including the Cache River and the adjacent wetlands, and so forth and so on. And everybody, even though the system was privately-owned by different ones, everybody got along. They accepted it as a wetland system, and they depended on the Cache for drainage. And everybody that owned it...accepted it as that's just the way it is.” (Ullin, Citizens Committee to Save the Cache Representative)

Closely related to the knowledge issue mentioned above, some key informants also expressed negative perceptions on the lack of sufficient effort on the part of the CRWJVP to disseminate information on its management activities and to solicit community input in its

decision-making processes through which local knowledge could be integrated into its management decisions.

“Like I said before, the JVP [CRWJVP] has never made the first announcement when a meeting was, where it was ... They've always had these meetings behind closed doors in areas that only JVP members was to attend and they didn't want the public there and they sure didn't want the public's input. And they didn't want the public's opinions or advice.”

(Ullin, Agriculture/ Big Creek Drainage Board Representative)

Physical Capital Outcomes

Key informants' perceptions on the impacts of the CRWJVP on the infrastructure of Ullin were also largely negative. The main focus was on damage resulting from the increased frequency and severity of flooding experienced by the community in recent decades.

During the interviews, key informants attributed the increased frequency of flooding in the Ullin community to a complex of factors, including the management actions associated with the members of the CRWJVP, but also management actions on private lands, as well as the adverse effects of changing climatic conditions.

“To me, personally, some of the ground is okay being in [a refuge or protected area]. But in the same respect, we've had some ground that was turned into that ... A lot of it was done by Fish and Wildlife [USFWS] and the government agencies, but a lot of them were done by farmers that turned it into hunting ground. When they done that, they put levees around their farms, made them a lake. Well, the floods that we have, like I was saying, climate change, they come quick, a lot of fast water. All those swales, bottoms, and valleys that they've gotten already flooded, there's no place for the water to flow out, to slow down the ability for it to come to the west fast. It's got to go someplace. So, those

areas are already full and a levee around it even if they're not full, so that means it's slow getting into those low-lying areas. I'm talking huge areas that would normally hold water to slow it down to keep it from coming this way. That's caused problems for us that are in this area right in here... So that's— do I like it? No, I don't. That's my opinion of it.”

(Ullin, Agriculture Representative)

It was also learned that the severity of the impacts of these floods on community infrastructure was compounded by the over-emphasis of the CRWJVP management organizations on ecological concerns in the watershed to the neglect of socio-cultural impacts. This neglect of socio-cultural impacts translates into the lack of provision of support to communities for the mitigation of the flood impacts.

“We just can't get rid of the water around here. Some of the houses, they ain't even got to be old. The houses that are built low to the ground, the joists underneath, they rot extremely easy down here because everything stays moist, 365 days a year. Nothing ever dries up unless we have a drought, and we've got to get some water away from here to be able to do that, you know. You always hear about the habitat being destroyed. That's where we're at, except it's not the habitat, it's the humans. That's the bad thing. You know the black mold and stuff that's in the houses? That comes from everything being wet underneath it. But you know, that's where we're at. Fortunately, we've got a concrete basement with a concrete roof on it and we don't have to fight that too much...” (Ullin, Agriculture Representative)

Natural Capital Outcomes

During the interviews, key informants expressed both positive and negative perceptions on the impacts of the CRWJVP on land and natural resources in the watershed. While some key

informants perceived that the management of the watershed by the CRWJVP has improved ecological conditions and recreational opportunities, and also led to the adoption of agricultural conservation practices, other respondents felt that the management approach of the CRWJVP has reduced access to agricultural land and put the watershed on the path of ecosystem degradation.

Some key informants expressed satisfaction with the management actions of the CRWJVP based on the perception that those management interventions have led to improved ecological health of the watershed, as well as enhanced opportunities for nature-based recreation and tourism.

“To me, it's God's blue print of how he wanted the earth. Obviously, the Cache River was flourishing here years ago, and through timber harvesting and different things, we lost some of that ... When I first got to this area, I really started seeing the small oak trees that were planted, I've seen them grow up, you know, to where 19 years later, the tree can grow pretty big. And seeing the wildlife flourish, and just going out and canoeing the Cache and seeing the duckweed, or as most people would say, 'oh that looks awful', that green duckweed, and then you rake your hand across that and you see the water is crystal clear underneath it. To me that tells me we've done something right. The decisions that were made were good decisions, to help bring back the Cache River basin. And seeing the wildlife, my family are big duck hunters. We like to duck hunt. We like to deer hunt. We also like to go out and watch the ducks and watch the deer. And you're seeing all that wildlife and I think it's paying off big dividends... I think it's helped it drastically. You can see the changes. In 20 years, you can see the changes. I didn't grow up here but my wife did, but from everything I was told from family members and from what I've seen,

I think it's improved it. I think it's been a plus.” (Ullin, Law Enforcement/Education Representative)

Another ecological benefit that key informants associated with the CRWJVP is the promotion of agricultural conservation practices among farmers in the watershed through landowner education and incentives programs being implemented by the NRCS. Some key informants noted that the adoption of these conservation practices among farmers in the watershed has resulted in a reduction in soil erosion levels in recent years.

“People today are more conscientious of erosion and keeping the soil where it should be. They use buffer strips, they don't plow right next to the creek. NRCS has been great ... to work with farmers who, and landowners, not just farmers, but landowners ... it's not just Cache, or Milk Creek or Big Creek, any creek. They are proactive in getting you to leave that buffer strip. And that has probably helped more in the last 25 years than anything in slowing this erosion down. (Ullin, Agriculture/ Big Creek Drainage Board Representative)

In spite of these benefits, key informants also discussed various negative impacts of the CRWJVP activities on the availability and access to land and other natural resources in the Ullin community. One issue of primary concern is the decline in the quality and quantity of agricultural land in the watershed due to flooding caused by the CRWJVP restoration activities. Some key informants who were not directly involved in the agricultural sector perceived that the intensity of the problem may have subsided over the years. However, responses from key informants representing the agricultural sector and other relevant sectors suggested that these problems still persist in spite of the efforts of some CRWJVP members to mitigate them.

“When I first got here years ago, some of the older gentlemen in the community ... I've heard comments made, how bad it was for this area because of the farm land and the land being bought up. Now it can't be farmed anymore, and they've changed the waterways, and we have flooding in different areas. But I don't hear much anymore. I haven't heard any negativity, really any negativity, in the last 15 years on. So in all aspects, I think, from the onset, as most changes, people come out of the gate maybe real heavily opposed to something, heavily opposed to change. Then after they start seeing the dividends from it, I think they loosened up. They learn to accept it and realize it was the right thing.” (Ullin, Law Enforcement/ Education Representative)

“I border Fish and Wildlife [USFWS] everywhere. They work with me pretty good, just like this last summer. We've got ground on the other side of the highway over here that I've got to mess with, and the drainage district don't have the money to work with it. But, like I said, in the past few years, [water] comes out of Cache and comes across what we call the 'old channel' that runs down this way ... Because it has nowhere to go out east of town out here, and north, because of the manmade levees around the farms that they put in WRP [Wetlands Reserve Program], or just put in some kind of set aside where they can flood it for ducks and whatever. But just like then, Fish and Wildlife came and helped us out, cleaning the banks. I mean, they couldn't do a whole lot. They only got certain months of the year that they can take any trees out, but they did give me a road around it. But I border them over here to the east of that and they wouldn't help me out over there and do anything on their ground. I don't know why, but the trees that were landing, if they hadn't already fell in Cache, they wouldn't take them out ... But they had the machinery there to do it and wouldn't do it, you know?...You guys are flooding me out

every time I turn around. And it's not them, it's the weather and everything else, but we could eliminate this or at least get it back to where it was 20 years ago by opening up some of this down through here ... The Drainage District board has really tried to go down through there on private property and actually take the trees off, so it can do its natural thing and go ahead and keep the banks open. And when we get to them, we have to stop or thin out, you know what I mean? We can't take out certain trees, and the only time it ever dries up along Cache is in the summer months, and they don't allow anything being done during the summer months.” (Ullin, Agriculture Representative)

In view of the persistent floods faced by farmers, it was even speculated that the failure of the CRWJVP to address the drainage problem in the watershed was a deliberate attempt to use the flooding as a tool to reduce the quality of agricultural land in order to force existing farmers off the land and to acquire more land for restoration purposes.

“I think it [CRWJVP restoration program] has harmed it [the watershed]. And the reason I think it has harmed it [is] because the restoration has created more, has limited the access of the drainage areas being checked. And by checked I mean to visually inspect them to see if there's a problem, and if there is a problem, to be enabled to get in there to correct the problem and open up a concern or eliminate the problem. And I still think they are using this water to damage the area so they can get more land.” (Ullin, Agriculture/ Big Creek Drainage Board Representative)

Beyond the problems associated with floods, other key informants perceived that the ecological health of the watershed was in a state of rapid decline. Fundamental flaws in the assumptions and goals informing the restoration efforts of the CRWJVP were identified as the source of the problem. A long-term resident and local conservationist explained that current

CRWJVP efforts led by the IDNR to create year-round wetlands in the watershed may be based on a mischaracterization of the historical conditions in the watershed based on incomplete data. Management actions based on this misreading of the landscape were depicted as major threats to the ecological health of the watershed.

“Well, it seems like what we're going to, what we're having to do is try to defend the wetlands as being dry. I mean, we know that's a big issue right now. They go back... a hundred years ago, and they saw an 1807 survey around here that said they couldn't get across because there was flood waters. Well they just said it: it's flood waters. It wasn't always that way, but during the survey time in 1807, they got it all written up that there was water there then. But there's also these trees so big that the pre-settlement people couldn't get them down, so if they survived that long to be that big ... Right now, the system is being destroyed by IDNR ... The water depth is gone. And the river, the river is filled in with log jams, beaver dams, and all that... And that 400-some acres [our consultant documented], he found 12 state-champion species of different trees. Two of them was national champions. Citizens Committee [Citizens Committee to Save the Cache] has got the certificates on these champion trees. The oldest was one a Bald Cyprus Tree ... The bald cypress was at least 1,000 years old and could be 1,300. In other words, when you figure that out, that tree started life 500 years before Columbus [Christopher Columbus] discovered America ... I've put that out in my book that I've written, and now, all of a sudden, everybody's using it. But they still say 'Water is supposed to be in that wetland. It ain't supposed to be dry in the summer time. It's supposed to be water out there, so we're trying to get it back to nature.' When you ask them, 'Why are you impounding water in the system that's got giant record trees?' They

say, 'Trees are not supposed to be there, historically.' Historically, there was permanent water out there and it was a swamp not a wetland, a swamp. But, when I tried to point out to [the IDNR representative], there was plenty of evidence, and any forester will tell you, water can't be in an area that's got 6-, 7-, 800-year old trees. Them trees had to start life when that ground was dry, and it had to remain so. Now all the oak trees that's been killed down there long time ago before the state even comes over, the trees was killed. ... It's a complicated system to everybody. It ain't complicated to me because I've growed up there ... And it ain't hard to fix. If they would just turn me loose, I could fix it in two years. All I've got to do is drain the beds of Cache down to its original open flow and then everything else would take care of itself, because the water will leave out in the summertime of the wooded area and then the trees would maybe survive. Not only that, nature creates a system that will re-create a forest... But, now the cypress [trees] are going down. They say, 'It ain't the permanent water that's killing the cypress, it's the silt deposits and the lack of oxygen in the water, and so forth and so on. It ain't the water. Water don't kill the cypress trees.' That's wrong, it does kill it if it's there long enough. It'll stand water longer than anything else, any other tree, but eventually it will kill it and it's doing' it right now. You could, you can drive down there. You don't have to go anywhere other than up and down the road, look out through there and see all the dead limbs hanging on them.' (Ullin, Citizens Committee to Save the Cache Representative)

Economic Capital Outcomes

Key informants' perceptions on the impact of the CRWJVP on the local economy of Ullin were largely negative. While some noted that benefits from tourism may outweigh the initial costs incurred by the community during the implementation of CRWJVP management

actions, the majority of key informants discussed various negative impacts of the CRWJVP, including the loss of local tax revenue, decline in employment opportunities, and decline in farm productivity.

During the interviews, some key informants expressed favorable perceptions on the impacts of the management programs of the CRWJVP on economic conditions in the community. Although there was the recognition that negative impacts may have been incurred at the inception of these programs, some key informants perceived that the overall impact of the programs has been positive due to the benefits derived from tourism.

“A lot of people will say, ‘Well, it took away our tax, something on our tax bases.’ Well, that's true to a certain extent, but the bottom line is you're making it back by the tourism and the amount of tax dollars put in your community, and that's to the good.” (Ullin, Long-term resident)

However, the majority of key informants perceived that the economic impacts of the CRWJVP programs have been negative. The decline in local tax revenue as a result of land acquisition by state and federal agencies affiliated with the CRWJVP program was a major concern for most respondents. Key informants linked the declining tax revenue caused by the land acquisitions to the rising tax rates among counties in the region.

“The only downside, I guess, of the whole thing was it took a lot of farmland out [of] production and that lowered some of the people's tax base that come into the county. I don't really think it affected Ullin per se as far as tax bases. It was more or less county level with the schools and stuff like that.” (Ullin, Local Government Representative)

“As far as the ground being bought off for the refuge, the only negativity that I could see in it would be possibly the tax revenue that was lost from it. A similar issue happened over in Hardin County when the Shawnee National Forest came in and bought a lot of property ... And eventually, over like 10 years, it raised everyone's tax rates because no more tax money was coming off that land. That would be the only negativity I could see from it.” (Ullin, Law Enforcement/Education Representative)

“So, Cypress Creek Refuge is 16,200 acres, well, in the two counties that it's in. So what happens there? Them acres all comes off the tax roll, so each county has to reduce their tax roll, and if they maintain their services, they have to tag it on to the people that's left. And there's a large discussion in Pulaski County right now about these taxes and assessments and all of that. So, I think that's going to come to a head in the next two years ...” (Ullin, Agriculture/ Big Creek Drainage Board Representative)

Another negative economic impact of the CRWJVP programs that was mentioned by key informants is the lack of adequate compensation of farmers during the land acquisition process. Some research participants felt that TNC took advantage of farmers during difficult economic times to purchase their land at relatively low prices.

“One reason they blame the refuge, is when the refuge was first coming in the 90's, soybeans and corn [price] drops to nothing. It's awful convenient that the government's trying to buy thousands of acres upon thousands ... They got what they wanted and boom, lots of farm stuff goes right back. Something ain't right there. I've said that all along ... I'm talking about people who owned places and sold out, because they knew they were going to go under. It was either sell out, or go bankrupt. And in those days, man, that was a dirty word. You ain't going to go bankrupt, nope. I'll just sell to the government.

Granted they were selling for 6, 7, \$800 an acre it's going for 2-, 3-, 4-, 5-, \$6,000 an acre now. That's kind of hard for me to swallow.” (Ullin, Law Enforcement Representative)

Some key informants also linked the acquisition of farmlands by the CRWJVP for restoration purposes to the loss of employment opportunities in the community.

“With the refuge coming in here, buying up all this land, throwing the farmers off, taking in all the production, letting it grow up in trees. There are no jobs there.” (Ullin, Agriculture/ Big Creek Drainage Board Representative)

Some of the responses also indicated that although the watershed has the potential for nature-based tourism, current approaches to managing the ecosystem may be adversely impacting visitation levels due to the limited access of recreationists and tourists to desired recreational settings in the watershed.

“I think it's a waste of federal funds, state funds, and private funds. And I know the Nature Conservancy and Ducks Unlimited are private entities, so they can do whatever they want with their money, and they do. They don't ask me, and that's fine, but I think they can spend their money in better ways than trying to harm the people of the Lower Cache valley. And they could really be significant in helping the communities and the area by working with the drainage districts and helping get this thing opened back up where it could be used by tourism. Ain't nobody going to try to bolt down through all them trees as we've seen a while ago. If you open it up, you got a chance to get some people to come down here.” (Ullin, Agriculture/ Big Creek Drainage Board Representative)

Finally, some key informants also complained about the decline in the productivity of existing farmlands in the community as a result of the flooding attributed to the management actions of the CRWJVP.

“It causes me problems ... Just like I was saying, I'm up on a ridge right here and I'm being jeopardized now. That ground down here [adjacent to the river], I used to farm every year, never lost a crop off of it. I haven't got a crop off it the last two years. And I got one off before, a half crop off of it the year before, and then two years the previous before that, I wasn't able to plant. I used to farm that, and we farmed that since I was seven, eight years old since it was cleared. And all that's changed.” (Ullin, Agriculture Representative)

Concluding Remarks

This chapter presented data representing key informants' perspectives on current conditions and ongoing transitions in the community of Ullin, the threats and opportunities presented by various drivers of change, and the ability of the community to successfully adapt to these forces of change. In addition to these general resilience attributes of the community, the chapter also presented data on community participation in the management programs of the CRWJVP, and the impacts of the programs on the resilience of the community.

With regard to current community conditions and ongoing transitions, key informants expressed both positive and negative perceptions covering the various dimensions of community capital assets. Perceptions on social capital included positive attributes, such as the sense of familiarity and solidarity among community members, the willingness of community members to engage in cooperative behavior to address common concerns, and the availability of a strong community leadership that catalyzes community collective action. However, the presence of

deviant behaviors, such as the use of illicit drugs was also reported as a negative attribute of the community. Key informants' responses on Ullin's human capital covered the positive aspects, such as the quietness associated with the small size of the population, and as well as the availability of effective leaders occupying key positions in the community. Nonetheless, negative perceptions were also expressed about the small and declining population, the increasing proportion of retirees and the elderly in the local population, and the lack of entrepreneurial skills due to out-migration of the working-age group. With regard to economic capital, positive perceptions were expressed about the success of the community in attracting and retaining a number of businesses that offer employment opportunities. It was also reported that the community had a funding package for the nurturing of businesses in the community. In spite of these positive attributes, key informants' perceptions on Ullin's economic conditions were largely negative based on the high rates of poverty and unemployment, as well as the high tax rates that hurt local businesses and community residents. Positive perceptions were also expressed by some key informants on Ullin's natural capital based on enhanced opportunities for recreation and nature-based tourism. However, perceptions of undesirable transformations in the ecological and hydrological system, as well as increased flood risk were also reported. With regard to physical capital, some positive developments, such as the renovation of existing infrastructure and the attraction of new service providers to the community were mentioned during the interviews. But deterioration of essential community infrastructure, such as roads and housing, as well as the inadequacy of drainage systems for flood control were also mentioned as areas of community dissatisfaction.

Key informants' perceptions of the threats posed to the community focused primarily on the increasing frequency and severity of floods. However, there was also the recognition of the

potential for other threats from changing climatic conditions and other biophysical factors. Opportunities for the development of the community were also identified, such as the TIF funding mechanism for local businesses, the geographic proximity of the community to the Interstate Highway System, and the potential for nature-based tourism development due to the location and resource endowments of the Ullin community. With regard to the capacity to mobilize the needed resources in response to threats and opportunities, key informants identified enabling conditions, such as the spirit of volunteerism among community members, as well as the presence of various civic organizations, particularly religious groups that play leadership roles in community response to floods and other threats. However, the inadequacy of community resources, as well as a culture of reactive coping rather than proactive adaptation were identified by key informants as limitations to the community's adaptive capacity.

With regard to community participation in the management programs of the CRWJVP, themes covered in the data comprised: knowledge; motivation; actual involvement; and barriers to participation. With regard to knowledge, the results showed that some key informants were moderately knowledgeable about the watershed and the CRWJVP. However, it was also reported that knowledge about the watershed and the CRWJVP is unevenly distributed among community members and key informants. The interviews also revealed that community members associate various meanings with the watershed that may result in diverse motivations for the conservation of the watershed, such as a source of recreation and tourism, and a symbol of community history and identity. The interviews also revealed that community members' participation in the management of the watershed has occurred in diverse forms, such as participation in outreach and educational programs, and participation in tree planting activities as part of the CRWJVP restoration program. However, no form of community participation in CRWJVP decision-

making processes was reported. Barriers to community participation that emerged from the interviews include the lack of awareness about CRWJVP meetings, lack of interest among community members, as well as unfavorable relationships between some community members and the CRWJVP due to grievances over past management actions.

Data on the impacts of the CRWJVP programs on the resilience of the Ullin community showed that the program has had differential impacts on the various types of community capitals. With regard to social capital, key informants reported a positive impact of the restoration programs on opportunities for social interaction among community members through recreational activities. Relations between the community and the CRWJVP were also perceived to be positive as a result of the joint organization of various events, such as Cache River Days. However, several negative aspects of the relationship between the community and the CRWJVP were also reported, such as conflicts associated with land acquisitions and drainage management, as well as disagreements between local conservation interests and the CRWJVP with regard to the management direction of the watershed. Key informants reported negative impacts of the CRWJVP programs on Ullin's human capital, such as the displacement of the local farmers, and declining opportunities for the utilization of local knowledge in resource management practices in the watershed. The impact of the programs on Ullin's physical capital was also perceived by key informants to be negative, as the programs were thought to have contributed to the floods that threaten community infrastructure. The CRWJVP was also thought to have paid inadequate attention to the social costs of its ecological restoration programs. Perspectives on the impact of the programs on natural capital were mixed. Positive impacts were reported in terms of enhanced ecological health and opportunities for recreation and tourism. But negative impacts of the programs on the quality and quantity of agricultural land, as well as the long term health of the

ecosystem were also reported. The economic impacts of the CRWJVP programs were also perceived by most key informants to be negative. While some highlighted the economic benefits of nature-based tourism, others emphasized the economic burden of the program on local tax revenue, employment opportunities, and agricultural land productivity. Moreover, compensations paid to farmers whose farmlands were purchased by the CRWJVP members for ecological restoration were deemed by some key informants as unfair to the farmers.

CHAPTER 5

DISCUSSION AND CONCLUSION

Introduction

Owing to the shortfalls in the conventional command and control approach to managing land and water resources, alternative institutional mechanisms, such as adaptive co-management and adaptive governance have emerged as more promising approaches for building resilience and reducing vulnerability in social-ecological systems. However, the impacts of these emerging institutional mechanisms on community resilience have not received adequate attention among researchers and policy-makers. Community resilience refers to a community's ability to maintain and utilize resources in order to thrive in a changing, uncertain, or unpredictable environment (Magis, 2010). The community resilience concept is closely related to the concept of social-ecological resilience which refers to a system's ability to withstand disturbance, self-organize, and learn and adapt to changing environmental conditions (Carpenter, Walker, Anderies, & Abel, 2001; Holling, 2001). Although the burgeoning literature on social-ecological systems suggests that there are several types of resilience, the distinction between general and specified resilience is of particular relevance in the study of community resilience. General resilience refers to the capacity of social-ecological systems to adapt to the uncertainties associated with all drivers of change, whereas specified resilience focuses on the capacity to cope and adapt to specific shocks (Folke et al., 2010). Folke et al. (2010) have cautioned that an over-emphasis on building the specified resilience of social-ecological systems to specific threats could compromise the capacity to deal with other forms of uncertainties. Thus, an appropriate approach to evaluating the impacts of water governance on community resilience is to focus on both the general and specified resilience of communities. Using the Cache River Watershed as a case

study, the purpose of this study was to explore the relationship between the ongoing transitions in water governance and the resilience of rural resource-dependent communities. Qualitative data for the study were generated through the review of documents, observation, and interviews with key informants representing two communities in the watershed: Ullin and Karnak.

Representatives of the Cache River Watershed Joint Venture Partnership (CRWJVP) and related organizations were also interviewed. Data from these diverse sources were triangulated to address specific research questions relating to the dimensions of community resilience, community participation in the management programs of the CRWJVP, and the resilience impacts of these programs. In the next section of this concluding chapter, key findings from the study will be discussed, followed by a synthesis of these findings. The limitations of the study, future directions for research, as well as conclusions and policy recommendations will also be presented in subsequent sections of the chapter.

Summary of Findings

In this section, key findings from the study are summarized and discussed. The section is organized using the same themes that were used in organizing the results of the study: community setting and context; community resilience dynamics; community participation in the CRWJVP programs; and outcomes of the CRWJVP programs.

Community Setting and Context

During the interviews, key informants from both communities were asked to describe current conditions in their communities, as well as changes that have been occurring in recent decades. Based on the community resilience perspective, the results were presented using categories based on the capital assets framework: social capital; human capital; natural capital; economic capital; and physical capital. In research on community resilience, capital assets have

been applied as measures of the well-being of communities and also as sources of the capacity of communities to adapt to drivers of change (Akamani 2012). Consistent with the broader literature, the use of capital assets in this study was aimed at exploring the dimensions of community well-being, as well as the general resilience of communities to successfully respond to the implementation of water governance policies and other drivers of change in the watershed.

Social Capital

Social capital, which refers to the networks of trust, reciprocity, and norms that promote cooperative behavior, was reported to be high in both Karnak and Ullin. Key informants from both communities highlighted several positive attributes of their communities, including the familiarity of community members with one another, the sense of solidarity with one another in times of need, and the cooperative spirit of community members that promotes collective action to address common threats, such as floods. These manifestations of social capital appear to have been enabled by the relatively small geographical area and population size of both communities that promotes repeated face-to-face interactions among community members. Key informants also mentioned the effectiveness of the local leadership in both communities as an important factor that creates opportunities for social interaction through which social capital is built. The high levels of social capital in both communities is essential for community resilience, as social capital facilitates the mobilization of resources, skills and knowledge in community response to various threats and opportunities (Greene and Haines, 2002; Pretty, 2003; Magis, 2010).

However, key informants in both communities also reported the incidence of deviant behaviors, such as the use of illicit drugs as a negative attribute. Key informants appeared to associate these deviant behaviors with newcomers rather than long-term residents in the communities.

Additionally, key informants in Karnak also mentioned the limited opportunities for engaging

the youth, as well as the limited trust between the community and external governmental entities as potential limitations in the community's social capital.

Human Capital

Human capital is another capital asset that plays an important role in promoting community resilience, as it enables community members to make and execute decisions that contribute to their well-being (Akamani, 2012). Communities, individuals and groups with higher levels of physical and mental health, education, and skills are likely to function effectively in decision-making and resource mobilization in response to drivers of change (Mayunga, 2007; Magis, 2010).

In both Karnak and Ullin, key informants' perceptions of the communities' human capital were largely negative, although a few positive aspects were also mentioned. Key informants in Ullin expressed positive perceptions about the small population size of the community and the availability of skilled personnel to man key positions, such as the major's office and the police department. However, key informants from both communities also highlighted the decline in the local population and the changing demographic composition of the communities, characterized by the out-migration of the working-age group and an increase in the proportion of retirees. Key informants in Ullin identified the lack of entrepreneurial skills and the difficulty of attracting external funds for community development as challenges resulting from the demographic characteristics of the community. And in Karnak, key informants also complained about the arrival of newcomers with attitudes that are unfavorable for community development as a challenge posed by the ongoing demographic transitions. These limitations in the human capital of Karnak and Ullin could have adverse implications for the capacity of both communities to respond to drivers of change, such as the implementation of conservation policies.

Economic Capital

Financial resources, including loans, investments, income, and savings all contribute to economic capital. Economic capital influences a community's ability to gain and maintain access to other resources, whether physical or intangible. Through its influence on the capacity for resource mobilization, access to economic capital constitutes an important determinant of a community's resilience to various drivers of change (Mayunga, 2007; Magis, 2010).

Key informants' responses indicated that Karnak and Ullin share similarities with regard to their economic capital. In both communities, key informants identified the existence of a few formal and informal establishments that offer employment opportunities. In Karnak, key informants mentioned informal businesses, such as a restaurant, a grocery store, and an auto repair shop, as well as formal establishments, such as the Shawnee Development Council and the MAP Training Center. Similarly, respondents in Ullin mentioned Southern FS and Masters Choice as some of the businesses offering employment opportunities to local residents. Key informants in both communities also mentioned various local initiatives to promote economic development as positive community attributes. In Karnak, the focus was on the recent construction of the Main Brothers Campground as part of efforts by the local community's leadership to promote nature-based tourism as an engine of rural development. Key informants in Ullin also depicted the designation of Ullin as a Tax Increment Financing (TIF) District as a positive attribute that could contribute to improving community members' well-being.

In spite of these positive attributes, much of key informants' responses relating to economic capital in both communities were largely negative. A common problem that was identified in both communities is the decline in non-farm sources of income and employment as a result of the collapse or relocation of existing businesses. In Karnak, key informants attributed

the limited ability of the community to attract and retain viable businesses to the low demand for goods and services in the community due to the small population size and widespread poverty. However, it was also learned that global economic and technological events, such as changes in shipping practices from the use of wooden crates to cardboard boxes accounted for the collapse of the Main Brothers Box and Lumber Company that used to serve as a major employment source in the community. Key informants in Ullin also recognized widespread poverty as a negative attribute of the community. However, they associated the collapse of local businesses to the unfriendly business environment created by high tax rates at the county and state levels, as well as regulatory requirements that complicate the process of establishing new economic ventures in the community. In all, it appears that the unfavorable economic conditions in both communities are the result of the interaction among a complex of factors ranging from the local to the global. These unfavorable economic conditions have obvious implications for the well-being of community members, as well as their ability to address common concerns.

Physical Capital

Physical capital comprises housing, transportation networks, water supply systems, energy systems, information and communication networks, and other forms of infrastructure for the delivery of various social services, such as health, education, and governmental responsibilities (Flora & Flora, 2004; Mayunga, 2007; Magis, 2010). Physical capital plays an essential role in shaping the well-being of community members as it influences the beauty of human settlements, as well as the convenience and efficiency with which various social and economic activities are executed.

During the interviews, key informants in both communities identified a few improvements in the infrastructure of their respective communities, although the overall

perception was that both communities lacked the essential infrastructure needed to support community well-being and resilience. Key informants in Karnak mentioned the construction of the Main Brothers Campground as a positive step toward the development of tourism infrastructure in the community. The construction of the campground at the site of the defunct Main Brothers Box and Lumber Company was perceived to have added to the beauty of the community. Key informants also mentioned the recent construction of a facility by a local church to provide shelter for flood victims in Karnak, as well as the establishment of Shawnee Community College as positive aspects of the community. In Ullin, key informants mentioned the attraction of new service providers to the community, such as a restaurant and a gas station as essential additions to the community's infrastructure. It was also reported that the recent renovation of the community's water supply infrastructure has improved the quality of drinking water. Key informants also noted that the renovation of previously derelict buildings has improved the beauty of the community.

In spite of these positive developments, key informants reported that major shortfalls in community infrastructure still persist in both communities. A common problem reported in both communities is the continued decline in the range of services provided as a result of the collapse or relocation of existing service providers. In Karnak, key informants mentioned the absence of a restaurant and a gas station while those in Ullin mentioned the closure of the local post office and the grocery store. In the absence of these service providers, key informants complained about the need to travel to urban centers in neighboring states to patronize basic services. Another common problem that was reported in both communities was the decline in the quality of existing infrastructure. Deterioration in the existing housing stock was frequently reported in both communities, a problem that was attributed to a decline in the culture of housing

maintenance among the youth, newcomers, and tenants. In addition to the housing problem, a decline in the quality of water supply infrastructure was also reported in Karnak, while a decline in road transportation networks was also reported in Ullin. Key informants in Ullin also highlighted the inadequacy of infrastructure for flood control. Perhaps, the greatest challenge related to physical capital in Ullin is the current drainage infrastructure. Because Ullin is bordered by the Lower Cache River to the south and Mill Creek to the north, the inadequacy of such critical infrastructure renders the community increasingly vulnerable to catastrophic floods.

Natural Capital

Natural capital, the stock of natural resources from which various resources and ecosystem services are derived, is essential to all facets of human life. Essential ecosystem services, such as air and water purification, as well as the production of food, wood and recreational opportunities support human well-being and can also be converted into economic capital. Accounting for natural capital is important, as it provides an indicator of the overall economic state (Costanza & Daly, 1992). The resilience and vulnerability of rural resource-dependent communities is also largely shaped by the natural capital upon which they depend.

In both Karnak and Ullin, key informants expressed positive perceptions about various benefits derived from the natural resources in the watershed. However, negative perceptions were also expressed, with most of them coming from key informants in Ullin. With regard to the benefits, key informants from both communities mentioned opportunities for recreation and tourism derived from the Cache River and the wetlands in the watershed as a positive attribute of their communities. In Karnak, the construction of the new campground and existing bike trails seemed to have provided the needed infrastructure for tourism promotion. Key informants in Ullin also mentioned the community's participation in tourism-related events, such as the Cache

River Days celebration. In addition to recreation and tourism, key informants in Karnak also mentioned enhanced access to food from the watershed through fishing and hunting as another benefit community members derive from the watershed.

With regard to the negative perceptions, key informants in Karnak noted that the residents of Karnak and other communities do not fully appreciate the value of their local ecosystem. This lack of recognition of existing opportunities could impede community efforts to harness existing natural resources for enhanced community well-being. In Ullin, key informants recognized the potential value of the local ecosystem as an input into community development efforts. However, they complained that the infrastructure for promoting recreation and tourism in the community has not been provided. Other key informants in Ullin expressed dissatisfaction with the current health of the ecosystem. Similar concerns were expressed about modifications in the hydrologic system that have impeded drainage in the watershed and contributed to flood vulnerability in the community.

Community Resilience Dynamics

The previous section discussed the multiple dimensions of well-being in Ullin and Karnak, as well as the patterns of change that have been occurring in these communities. The analysis revealed that ongoing transitions in the communities are influenced by multiple drivers of change emanating from within and outside the communities. This section further explores these dynamics by discussing key informants' perceptions of the threats and opportunities presented by various drivers of change, as well as the capacity of the communities to successfully adapt to these forces of change.

Threats

Communities are always exposed to various drivers of change that may present threats to community well-being and resilience. The nature of the threat may vary based on the attributes of the driver of change, such as its frequency, magnitude, duration and intensity (Cutter et al., 2008; Akamani, 2012). A common theme that appears in the resilience and vulnerability literature is that a resilient community will likely experience less severe impacts from these drivers of change (Mayunga, 2007). Furthermore, a resilient community will more likely have the ability to anticipate, monitor, and respond to potential threats (Birkmann, 2006; Colten et al., 2008).

When key informants were asked about the threats facing their communities, flooding was the most frequently mentioned problem. Key informants in Karnak attributed the floods to the modification of the hydrologic system in the watershed through the construction of engineering structures, such as the Post Creek cut-off, as well as ongoing management efforts focused on protection and restoration of ecosystems in the watershed. The flood risk to the community was said to have been exacerbated by a breach in the Karnak levee that occurred more than a decade ago. In Ullin, key informants also highlighted the flooding problem. Key informants mentioned the topographic features of the landscape, alterations in the hydrologic system, and inadequate responses from the CRWJVP and the local drainage district as sources of the problem.

Besides the issue of flooding, key informants from both communities also recognized the potential occurrence of other environmental stressors the communities have experienced in the past, such as ice storms. In both communities, only a few respondents perceived that climate change was a potential threat. Increasing temperatures, increased frequency of storms, as well as drought were mentioned as observed patterns of changing climatic conditions. Flooding, crop

failure, overgrowth of vegetation, and adverse impacts on fish were also mentioned by some key informants as consequences of these changing climatic conditions. Besides these environmental stressors, key informants in Karnak also mentioned the declining employment opportunities in the community as a major threat to the community's sustainability. One key informant even expressed fear about the eventual collapse of the community if current trends in out-migration as a result of the lack of employment opportunities continue.

Opportunities

Key informants were also asked about existing opportunities or potentials for improving the well-being of community members. In both communities, key informants mentioned the promotion of recreation and tourism based on the ecosystems in the watershed as a potential strategy for community development. Key informants in Karnak mentioned the construction of the Main Brothers Campground, as well as the existing Tunnel Hill State Trail linking Harrisburg and Karnak as essential infrastructure for realizing this development strategy. The annual Illinois River-to-River Relay and the 2017 solar eclipse were also mentioned by key informants as events the community was preparing to utilize in promoting their tourism agenda. Although key informants in Ullin also recognized nature-based tourism as an opportunity for community development, they were less optimistic about the ability of the community to benefit from this opportunity. However, Ullin's proximity to the Interstate Highway System, and its designation as a TIF district were mentioned as opportunities for the development of the community. It appears these opportunities could be harnessed for developing the community's tourism potential.

Another opportunity that was mentioned by key informants in both communities is a proposed road transportation network. Known as the Shawnee Parkway Project, this proposed

transportation network is aimed at reducing travel times, improving safety, and enhancing economic development opportunities in the region. Key informants in both communities perceived that the enhanced accessibility of the communities through this project will provide opportunities for economic development, including the development of tourism. Thus far, there has been resistance to the project from environmental groups on the basis that creating a highway through the Shawnee National Forest would cause undue ecological damage through ecosystem fragmentation and other human impacts.

Adaptive Capacity

One of the assumptions underpinning the idea of community resilience is that communities are not isolated entities. Rather, they are interconnected with other levels of social organization, such as regional, national, and global levels (Berkes & Ross, 2013). Communities are influenced by various drivers of change that emanate from these different levels of scale. These drivers of change may present opportunities, as well as threats to community sustainability (Akamani, 2012). In this regard, community resilience is essentially about the ability of communities to reduce the adverse effects of threats and to take advantage of opportunities presented by drivers of change so as to maintain or enhance the well-being of community members (Akamani & Hall, 2015). Community resilience and adaptive capacity are closely related concepts that are often used interchangeably. Folke et al. (2010) define adaptive capacity as the ability of individuals to collectively influence the resilience of a system. Similarly, Magis (2010) defines community capacity as the ability of a community to use its capital assets to engage in collective action to react to and address a variety of circumstances. Community resilience and adaptive capacity are products of multiple capacities (Norris, et al., 2008), and these multiple dimensions are often represented by the capital assets framework. Previous

sections of this chapter have analyzed the current stock and changes in community capital assets, as well as perceived threats and opportunities presented by various drivers of change. In this section, results on the capacity of communities to respond to these threats and opportunities will be discussed.

In both communities, key informants expressed optimism about the ability of their communities to address certain change events, although limitations in community adaptive capacity were also recognized. In Karnak, responses touched on the ability of the community to benefit from existing opportunities, as well as to mitigate threats. The construction of the Main Brothers Campground was again cited as an illustration of the capacity of the community to take the necessary steps to benefit from existing economic opportunities in recreation and tourism. With regard to the ability of the community to respond to threats, key informants mentioned several sources of their adaptive capacity, including the historical experience of the community in dealing with floods and ice storms, previous success in acquiring funding from the Federal Emergency Management Agency (FEMA), the role of civic organizations, such as churches, and the overall cooperative spirit and cohesiveness among community members that promote collective responses to these threats. Similar to the case of Karnak, key informants in Ullin attributed the community's capacity to respond to floods to their shared religious beliefs as Christians, the role of the local churches, as well as the spirit of volunteerism and the networks of support among community members. A representative of one of the local churches noted that the church has an evacuation center as well as a contingency plan on flood response.

While key informants were confident in the ability of their communities to undertake short-term coping strategies, they were less optimistic about their ability to effect fundamental long-term changes. The lack of adequate resources was mentioned as a major limitation to the

communities' adaptive capacity. In Karnak, key informants were not hopeful that ongoing efforts to promote tourism will be enough to reverse the downward economic trend and declining population of the community. Similarly, key informants in Ullin were not confident that the community could mobilize resources to implement measures that could reduce the vulnerability of the community to flooding. Another common barrier to adaptive capacity that was mentioned in both communities is the prevalence of a culture of reactive coping strategies after experiencing a driver of change, rather than implementing proactive measures. Some key informants saw this as an entrenched behavioral tendency that will be difficult to change.

Community Participation

The previous sections of this chapter focused on the general resilience of Karnak and Ullin. The subsequent sections shall explore the communities' specified resilience with regard to their ability to successfully respond to the ongoing transitions in water governance in the watershed. In this regard, this section discusses the results on the knowledge, motivation, and involvement of residents of Karnak and Ullin in the management programs undertaken by the CRWJVP, as well as barriers encountered by community members in the participation process. In addition to revisiting the perspectives that were expressed by key informants in the results chapters, the ensuing discussion shall also draw from relevant perspectives expressed by representatives of the CRWJVP and other organizations involved in the management of the watershed.

Awareness

The results showed that knowledge on the watershed in general, and the management interventions of the CRWJVP in particular varied greatly among research participants in both communities. In Karnak, key informants representing the local government and other community

organizations appeared to be quite knowledgeable and privy to current information on the resource management efforts of the CRWJVP. However, other key informants had little to no knowledge of the CRWJVP, and some even claimed not to be familiar with the Cache River and the wetlands in the watershed. Responses from key informants in Ullin also showed a similar variation in knowledge, with some being moderately knowledgeable while others admitted to knowing very little about the CRWJVP. One key informant remarked that most residents of the community truly have no knowledge on the management of the watershed because they have no interest in learning about the watershed. In a study on the predictors of awareness of the Cypress Creek National Wildlife Refuge, Mangun et al. (2009) found that race and distance from the refuge were predictors of awareness, as African Americans were less likely to be aware of the existence of the refuge than whites. The authors highlighted the need for communication mechanisms that are tailored to specific groups in order to enhance environmental justice in the watershed.

Motivation

The meanings residents of Karnak and Ullin associate with the watershed were explored as a means of understanding community members' motivations for participation in the management of the watershed. Consistent with findings from Davenport et al. (2010), key informants expressed diverse meanings about the watershed. In both communities, key informants expressed positive attitudes toward the watershed, based on its value as a source of recreation and tourism. Some respondents valued the ability of the watershed to attract tourists from outside the region to visit their communities, while others valued the opportunity for social interactions among family members and other community members through local recreational pursuits.

Key informants from both communities also valued the Cache River and the wetlands in the watershed as an integral part of the history and identity of the communities and the region. These deep cultural connections to the landscape may constitute a taken-for-granted source of resilience that motivates community members to continue to cope and adapt to various social and ecological threats in the region.

In addition to these shared perspectives, key informants in Karnak also highlighted the importance of the watershed as a source of livelihood. Through opportunities for fishing and hunting, the watershed provides food in a region characterized by high levels of poverty and limited availability of restaurants and grocery stores. There were, however, other key informants who expressed unfavorable attitudes toward the watershed because of its limited contributions to income and employment opportunities in the community.

Involvement

Community involvement in the management interventions of the CRWJVP was also explored during the fieldwork and the results showed only minor differences between the two communities. In both communities, key informants reported variations in the level of participation among community members, with moderate levels of involvement among some community members, and minimal levels of involvement among others. A common form of participation that was reported in both communities is community involvement in outreach and educational programs, including festivals, such as Cache River Days in Ullin, and NatureFest in Karnak. Key informants in Karnak saw the joint organization of NatureFest between the community and the CRWJVP as an integral part of the community's tourism promotion efforts. Environmental education programs targeting local schools in the watershed and the general public were also mentioned in both communities. In addition to these educational programs, key

informants in Karnak mentioned that some form of cooperation exists between the community and members of the CRWJVP with regard to flood control efforts. And in Ullin, some key informants mentioned the community's involvement in the planting of trees as part of the CRWJVP's forest restoration efforts. Responses from CRWJVP representatives corroborated these community perspectives.

“Landowners are involved with our reforestation projects. It involves them whether it's voluntary or involuntary, cause we're actually taking land out, and maybe some of the folks had farmed as cooperators... Our big events, you know, Cache River NatureFest, we have huge community involvement in planning and preparing and actually implementing that, 108 volunteers. Many of them are students from SIU [Southern Illinois University] but many of them are local people that help us put on that event. We have Stewardship Saturdays, where we have local community members come out and help us. Students in the college or grade schools help us with planting trees. As far as planning goes... a good example of that would be from a refuge standpoint. We have to go through NEPA [National Environmental Policy Act], like with our hunting plan and our trapping plan. We had community involvement and comment to help us with all that.”
(USFWS Representative)

The quote above suggests that community members are involved in NEPA planning processes by the USFWS. However, responses from key informants representing both communities indicated that neither of the communities has been involved in the decision-making processes of the CRWJVP members. Some key informants from both communities even mentioned that some members of the two communities are not involved at all in the management efforts of the CRWJVP. The inadequacy of community participation in the CRWJVP programs

as expressed by community representatives in this study is consistent with findings from previous studies in the watershed (e.g. Adams et al., 2005; Davenport et al., 2010).

Barriers to Participation

This section discusses findings on the barriers inhibiting community participation in the management activities of the CRWJVP. Key informants from both communities identified common barriers to community participation: lack of awareness; lack of interest; lack of opportunities for participation; and lack of capacity. These barriers appear to be a function of shortfalls in community capital assets, as well as limitations in the design and implementation of CRWJVP programs.

The lack of awareness about CRWJVP programs among community members was identified by key informants in both communities as a barrier to participation. The problem was blamed on the inadequacy of mechanisms for information-sharing on the part of the CRWJVP. Key informants in Ullin speculated that the failure of the CRWJVP to share information on meeting schedules and other activities may be an intentional effort to avoid conflicting encounters with the Big Creek Drainage District and other groups. Key informants in Karnak also noted that the lack of transparency on the part of the CRWJVP creates mistrust and misperceptions among community members. These results are consistent with findings from previous studies in the watershed (e.g. Bridges et al., 2007).

A closely-related barrier that was identified is the lack of meaningful opportunities for community participation. For instance, while some key informants in Karnak had attended some of the meetings held by the CRWJVP, they noted that there were no structured mechanisms for integrating the input of local communities into decision-making processes. It appears that opportunities exist for communities to be informed or consulted by the CRWJVP on an ad-hoc

basis. However, opportunities for cooperation between communities and CRWJVP members as equal partners do not seem to exist in the watershed. These results highlight the difficulty of moving toward truly collaborative processes for landscape scale conservation (Mullner et al., 2001).

The lack of interest among some community members in the management efforts of the CRWJVP was also mentioned as a barrier to participation. Key informants in Ullin mentioned that the adverse economic impact of past CRWJVP management actions on farmers in the watershed has resulted in an unfavorable relationship between the two groups. Similarly, key informants in Karnak identified farmers as a group that is less likely to be interested in participating in CRWJVP management actions. In Ullin, key informants also mentioned the restricted access to the Cypress Creek National Wildlife Refuge as an issue of concern. These restrictions limit the recreational and livelihood benefits communities derive from the watershed, thus reducing community motivation for participation in resource management efforts.

The last sub-category of barriers relates to limitations in community capacity for participation in the CRWJVP management programs. One key informant in Karnak explained that the long hours of work and the stress associated with the harsh economic conditions in the community implies that residents have less time to spare for participation in resource management efforts. This viewpoint is consistent with the existing literature on social capital that suggests that poverty levels influence participation in civic activities (Rupasingha et al., 2006). Another aspect of the limited community capacity that was mentioned during the interviews relates to the limited availability of transportation services for elderly and knowledgeable residents who have the time to volunteer in communal activities. The lack of an efficient public transportation system was, thus, identified as barrier to participation. Similarly, the remoteness of

the watershed from larger settlements was mentioned in the interviews with representatives of the CRWJVP as a barrier to the attraction of willing volunteers, such as conservation-minded students from Southern Illinois University. In all, these barriers in community capacity appear to reflect the shortfalls in community capital assets and the adverse influences of multiple drivers of change as discussed in previous sections of this chapter.

“People, every day, would come into Giant City [State Park] from SIU wanting to volunteer or work, do something to help the project, but it was really hard to get that number and that interest to come walk in the door down at the Cache, because it was so rural... It was too far from SIU, too far from anything... They don't have the resources that some of the larger communities have ...” (IDNR Representative)

Interviews with members of the CRWJVP and other relevant organizations in the watershed also highlighted limitations in organizational capacity among the CRWJVP members as a barrier to the effective promotion of community participation. Specifically, key informants noted that while genuine efforts have been made by the CRWJVP to promote community participation in the past, mistakes were made due to the lack of experience of CRWJVP members in such public involvement processes. For instance, the narrow selection of stakeholders by the CRWJVP that did not fully represent all segments of local communities in the watershed has been identified as one of the flaws in past planning efforts in the watershed (Adams et al. 2005). During the interviews, the lack of appropriate protocols for engaging community members was cited by key informants representing the CRWJVP as a reason for failures in the public involvement processes.

“Well, most of the initiatives that we had as far as restoration, or any projects that we wanted to do, we tried to have an open public initiative in order to get people in to sit

down and meet, and talk about what we wanted to do before we ever made decisions about what should be done, or could be done, or whatever. Particularly with [Big Creek] Drainage District, [Alexander-Pulaski County] Farm Bureau, the mayors at the different communities... We also, I think about the year 2000, built and opened the Wetlands Center... We tried to use that as the hub for bringing people in to learn about the Cache, and so we would try and reach out and make sure the schools and teachers were coming. Again, the mayors, the local elected officials and so forth to try to get them in because there was quite a story in there to be told... But, overall I think, and you may very well find disagreement from people down there, that for whatever reason, did not get engaged, and so they never got their level of the information they had and the knowledge they had never changed. I don't think that that was the fault of the JVP [CRWJVP]. I think the JVP really did try and reach out and talk to people, and I think that improved as time went on. I think from early on we walked into a project and we were pretty green. We didn't know. I mean we knew basically that we needed to talk to people, but little by little I think, especially as the different groups down there, and we started to interact with them, we started to put a little bit of a plan together.” (IDNR Representative)

Outcomes

This section discusses the results on the perceived impacts of the CRWJVP programs on the various dimensions of resilience in Karnak and Ullin. The discussion is structured based on the capital assets framework that was used to operationalize community resilience in this study. In discussing these results, the section also relates the findings to the potential contributions of adaptive water governance to the various dimensions of community resilience.

Social Capital Outcomes

Transitions in water governance toward adaptive water governance offer a number of opportunities for enhancing social capital in resource-dependent communities. For instance, opportunities for meaningful participation through analytic deliberation processes could contribute to building trust among scientists, resource managers and other stakeholders (Dietz et al., 2003; Akamani & Wilson, 2011). The polycentric institutional structure of adaptive governance that entails the nesting of different organizations across multiple scales, also provides opportunities for building social capital by reducing conflicts and reconciling diverse interests across scales (Cole, 2015; Schultz et al., 2015; Akamani, 2016). In all, these opportunities for vertical and horizontal interactions among diverse actors in adaptive governance processes could potentially contribute to building bonding and bridging social capital within and among communities, as well as linking social capital between communities and external actors from higher levels.

In the case of the Cache River Watershed, the results of this study showed that the management programs of the CRWJVP have affected the communities of Karnak and Ullin in both positive and negative ways. In both communities, key informants reported some positive impacts of the CRWJVP programs on linking social capital between the communities and the CRWJVP members. In Karnak, it was reported that the community cooperates with some members of the CRWJVP in addressing specific community concerns, such as flood control and tourism promotion, although it was also learned that these interactions are ad-hoc in nature, and that contact with the CRWJVP is limited to the community's leadership rather than the entire community. And in Ullin, linking social capital was also evident in the joint organizations of programs, such as Cache River Days between the community and members of the CRWJVP.

Key informants in Ullin also reported improved bonding social capital within the community due to the enhanced access to recreational settings that provide opportunities for social interaction among family members and other community residents.

However, negative impacts of the CRWJVP on bonding and linking social capital were also reported in both communities. Respondents from both communities highlighted the declining levels of trust and cooperation between CRWJVP agencies and communities resulting from the longstanding litigation between the IDNR and the Big Creek Drainage District over the management of the Karnak levee. A representative of the local government in Karnak mentioned that the community has had to fund the maintenance of the levee while IDNR and the Big Creek Drainage District remain in a stalemate over the responsibilities of maintaining the levee. Other key informants expressed frustration over the lack of an effective mechanism for information-sharing on the problem, as well as the absence of an effective mechanism for resolving disputes resulting from the multiple competing perspectives held by stakeholders in the watershed. Besides these ongoing conflicts, key informants in Ullin also reported a history of conflicts stemming from the acquisition of private farmlands in the watershed by the CRWJVP, as well as differences in management approaches between the CRWJVP and the Citizens Committee to Save the Cache, a community-based conservation organization that is credited for initiating efforts to conserve the wetlands in the watershed in the 1970s. These issues reflect the wicked and intractable nature of the conflicts in the watershed (Akamani et al., 2016).

Human Capital Outcomes

The governance of water resources based on the principles of adaptive water governance could offer a number of opportunities for enhancing human capital in resource-dependent communities. Whereas the conventional command and control approach to water resources

management emphasized the use of scientific knowledge derived from the reductionist method, adaptive water governance promotes the use of integrated knowledge systems (Akamani 2016). Knowledge integration may occur through various forms of cross-disciplinary collaboration, as well as recognition of local and traditional ecological knowledge in ecosystem management processes (Akamani et al., 2016). Social learning, which refers to learning that occurs through social interaction processes (Reed et al., 2010), is also an essential part of the knowledge that is utilized in adaptive water governance (Pahl-Wostl et al., 2007). The integration of these diverse types of knowledge in adaptive water governance is facilitated through the analytic deliberation process that promotes scientific analysis and public deliberation. The polycentric institutional structures of adaptive water governance also facilitate learning and experimentation at lower levels, as well as knowledge integration across scales (Akamani, 2016).

In the case of the Cache River Watershed, key informants perceived that the CRWJVP has had both positive and negative impacts on human capital in both communities. In Karnak, key informants mentioned the educational opportunities provided by the CRWJVP through various programs, such as local festivals, field trips, and services provided by the visitors' center as positive impacts. The opportunity for environmental education among children in the region was particularly emphasized by some key informants as an important contribution of the CRWJVP. Consistent with findings from Hancock (2017), these results suggest that the CRWJVP may have contributed to the promotion of social learning among residents in the watershed.

However, responses from key informants also indicated that the CRWJVP may have had adverse impacts on the utilization of traditional ecological knowledge in the watershed. In Ullin, key informants noted that the acquisition of farmlands by the CRWJVP members for restoration

purposes and the subsequent change in management authority of the local ecosystem from local residents to members of the CRWJVP has disrupted the previous resource regime that entailed the management of the watershed by local residents using their local knowledge which has been accumulated over generations. It was also learned that the decline in opportunities for the utilization of local and traditional knowledge has been compounded by the lack of avenues for the meaningful involvement of local residents in CRWJVP decision-making and implementation processes. Key informants in Ullin also associated the acquisition of farmlands by the CRWJVP with the decline in the population of the community as a result of the out-migration of farming families. The selective migration of the youth could further threaten opportunities for the inter-generational transmission of local and traditional knowledge from older to younger community members.

Economic Capital Outcomes

The pursuit of integrated management goals in ecosystem-based resource management processes is also a defining feature of adaptive governance (Schultz et al., 2015). Through this holistic approach, adaptive governance and adaptive co-management regimes offer opportunities for enhancing livelihood sustainability without compromising the attainment of ecological goals (Schultz et al., 2010). While conflicts are inherent in integrated resource management, the use of analytic deliberation in adaptive water governance offers a more effective mechanism for reconciling the diverse values and interests held by stakeholders (Akamani et al., 2016).

In this study, key informants from both communities reported both positive and negative impacts of the CRWJVP management actions on the local economy. On the one hand, the potential economic impacts of the enhanced opportunities for recreation and tourism were highlighted in both communities. On the other hand, key informants from both communities

mentioned various negative impacts associated with the acquisition of private lands by the CRWJVP for its ecological restoration program. A decline in the tax base of local governments as a result of these acquisitions received attention from most key informants. Moreover, key informants in Karnak expressed concerns over the loss of control over private property and authority for managing their local resources as a result of these acquisitions. Similarly, key informants in Ullin attributed several economic challenges to the land acquisitions, including an increase in local tax rates to compensate for the loss of taxes from private lands, inadequate compensation of farmers in the land acquisition process, and loss of farm-based employment opportunities as a result of the change in land use from agriculture to ecological restoration. Moreover, key informants in Ullin expressed dissatisfaction over the limitations in the tourism potentials of the community due to the lack of appropriate infrastructure for promoting access to recreational settings. Additionally, a decline in agricultural productivity as a result of the flooding of agricultural fields in the watershed was mentioned as a negative impact of the CRWJVP on the local economy of Ullin. In all, these results suggest that mechanisms for the equal consideration of livelihood concerns of local communities may not yet have received adequate attention by the members of the CRWJVP.

Interviews with CRWJVP officials revealed that the members of the partnership are aware of community members' perceptions on the negative impacts of the restoration program. However, these community concerns were attributed to a lack of technical understanding of the management interventions of the CRWJVP.

“They have, a lot of the communities in the watershed, a couple, in particular, have very important flooding issues and so they didn't always, I think, have a formal understanding, especially from an engineering standpoint, of what water levels mean. I think there was

this perspective out there that DNR [IDNR] or the conservation agencies out there could have an impact on their community. So, that was always something that ... We had to work with those communities to try and educate them to show them, what could and couldn't be done and how much water you could put on structures and not affect the farming or the communities.” (IDNR Representative)

Contrary to the success stories on adaptive governance reported in Schultz et al. (2015), the lack of agreement between the communities and the CRWJVP on the prioritization of local livelihoods offers little hope that a transition toward a truly integrated management approach that simultaneously addresses community development and ecological concerns will be occurring soon in the watershed.

Physical Capital Outcomes

Dietz et al. (2003) identified the availability of infrastructure as an essential requirement for adaptive governance. Components of physical capital, such as transportation and communication infrastructure, contribute to the well-being of communities, as well as the effective performance of institutions. However, it could also be argued that the effective governance of water resources based on the principles of adaptive governance and adaptive co-management could provide opportunities for building physical capital in resource-dependent communities. For instance, a comprehensive approach to promoting community well-being and ecosystem health in adaptive governance regimes might include the provision of essential community infrastructure, such as housing, health, education, water and sanitation. Moreover, the development of institutional infrastructure at the community level is likely to occur in adaptive governance regimes through the mobilization and sharing of resources between communities and external partners within the multi-level governance structure of adaptive

governance. The absence of enabling policies that guarantee community access to the requisite resources and institutional space could undermine the success of adaptive governance regimes (Bark et al., 2012).

During the interviews, key informants in Karnak mentioned the management of the Main Brothers Campground in the community as the outcome of coordinated efforts between the community and the IDNR, a prominent member of the CRWJVP. Additionally, key informants mentioned the construction of the Henry N. Barkhausen Wetlands Center by the CRWJVP as an important addition to the infrastructure that can be utilized by the community. In spite of these benefits, key informants from both Ullin and Karnak mostly expressed concern over the increased frequency of flooding experienced by communities in the watershed. Some key informants attributed the floods to the ongoing stalemate between the IDNR and the Big Creek Drainage District over the management of the Karnak levee. The inadequate consideration of social impacts in the management efforts of the CRWJVP, land management practices by private landowners in the watershed, as well as the effects of climate change were also mentioned by other key informants as contributing factors to the flooding problem. The effects of these floods on the communities' infrastructure include the deterioration of housing conditions, as well as a decline in the housing market in the communities. Contrary to these community perspectives, interviews with representatives of the CRWJVP revealed that some CRWJVP members perceived that they were doing their best to mitigate flood risk and other adverse impacts of their management interventions in the watershed. Here too, the lack of agreement between the communities and the CRWJVP on the severity of impacts suffered by communities could impede the collective mobilization of resources to address community concerns.

“What we've tried to do, from day one, is say, ‘We're not gonna take your land.’ Thank God we've never had to, and we never will, you know. I think they've seen that we have tried to maintain drainage, we're not flooding people out. When there's an issue on us, we have an obligation to get the debris dam out, or the beaver dam out, so it doesn't flood. So that's our responsibility, it's written in our environmental assessment.” (USFWS Representative)

Natural Capital Outcomes

A shift from narrow sectoral policies toward ecosystem-based approaches for managing multiple ecosystem services is a defining feature of adaptive governance (Folke et al., 2011; Schultz et al., 2015). The pursuit of such integrated goals based on assumptions on the complexity of social-ecological systems, the mobilization of knowledge from diverse sources, as well as the emphasis on monitoring and adaptive management in adaptive governance processes could contribute to a better understanding of ecosystem dynamics. Importantly, the capacity for actors to effectively implement ecosystem-based management programs could be enhanced through the mobilization of resources and skills, as well as opportunities for interaction among state and non-state actors in adaptive governance regimes (Schultz et al., 2015).

In the case of the Cache River Watershed, key informants from both communities expressed both positive and negative perceptions on the impacts of the CRWJVP management activities on the communities' natural capital. On the one hand, the positive impacts of the CRWJVP management actions on the health of ecosystems in the watershed was mentioned by most key informants. In Karnak, for instance, an observed increase in the size and abundance of wildlife in the watershed, as well as the health of the forest was reported. And in Ullin, key informants reported a reduction in soil erosion as a result of the promotion of conservation

practices, such as the establishment of riparian buffers on agricultural fields in the watershed through federal programs implemented by the NRCS. Key informants from both communities also mentioned the enhanced opportunities for nature-based recreation and tourism as a positive outcome of the CRWJVP management efforts.

On the other hand, some key informants also expressed dissatisfaction with the ecological conditions in the watershed. In Karnak, the problem was attributed to the ongoing conflicts over the Karnak levee. In Ullin, one key informant identified flaws in the knowledge base and goals of the CRWJVP management program as sources of threat to the ecological health of the watershed. Key informants in Ullin were also concerned about the limited physical access to farmlands as a result of the floods and management restrictions associated with the CRWJVP. One key informant even speculated that the CRWJVP may be intentionally inducing the flooding of farm lands as a means of acquiring more private lands for ecological restoration purposes.

Synthesis of Findings

A number of key findings can be discerned from the results of this study that illustrate the complexity of resource-dependent communities (Magis, 2010; Akamani, 2012; Berkes & Ross, 2013). First, the results from the analysis of the general resilience of the two communities suggest that the well-being and resilience of resource-dependent communities has multiple dimensions, and these dimensions can be represented by the capital assets framework. Rather than being uniformly distributed, key informants' responses indicated that there were variations in the stock of the various capital assets possessed by the communities. For instance, while social capital was perceived as a positive attribute in both communities, economic and physical capital were largely perceived as weaknesses of the communities. These differences in the stock of capital assets may have implications for the overall resilience of the communities.

Second, the results also showed that the capital assets that shape community resilience are not static, but rather change over time. Changes in the various community capital assets did not seem to occur in isolation from one another, as the results revealed complex cause-effect relationships among them. For instance, declines in the population size (human capital) of both communities appear to be largely driven by declines in employment opportunities (economic capital), with the decline in human capital also driving further declines in social capital, physical capital, and economic capital.

Third, key informants linked the changes in community capital assets to multiple drivers of change emanating from within and outside the communities, including changes in attitudes among the youth and newcomers, local tax policies, global economic trends, global environmental change, and the implementation of conservation policies. For instance, the decline in housing conditions (physical capital) in both communities was attributed to the unfavorable attitudes among the youth and newcomers, as well as the increased risk of floods from changing rainfall patterns and the restoration projects of the CRWJVP. Similarly, declines in economic capital in both communities were attributed to the acquisition of farmlands as part of the CRWJVP restoration efforts, unfavorable tax policies at the county and state levels, and the small population size of the communities that limit their ability to attract and retain business ventures. Key informants in Karnak even linked the collapse of the Main Brothers Box and Lumber Company to changing preferences in the global shipping industry.

Fourth, the results also revealed that communities' exposure to these multiple drivers of change presents both opportunities and threats to community development, and that the attributes of a given community may enable or constrain its ability to respond to these threats and opportunities. For instance, while key informants identified community attributes, such as the

spirit of volunteerism, shared religious affiliations, and community historical experience as enabling conditions for dealing with various drivers of change, they also identified limited financial resources and an entrenched culture of reactive planning as limitations to community adaptive capacity. In all, key informants in both communities seemed optimistic about the ability of their communities to cope and adapt to existing conditions. However, they were less optimistic about their communities' ability to undertake the transformational change needed to reverse declining socio-economic conditions.

Fifth, the analysis of the specified resilience of the two communities to the changing water governance mechanisms in the watershed showed that members of both communities have had moderate to minimal levels of involvement in the management programs of the CRWJVP. Limitations in knowledge, interest, capacity and opportunities for participation accounted for the limited levels of community involvement. While lack of interest in CRWJVP activities among certain segments of the population was reported, a more frequently mentioned barrier to participation was the lack of access to information on CRWJVP decision-making schedules. Although community participation in various CRWJVP education and outreach events were reported, opportunities for community involvement in the decision-making processes of the CRWJVP did not seem to be open to community members, a finding that departs from the ideals of adaptive water governance. Limitations in the capacity of communities and the CRWJVP members were an equally important constraint to the effectiveness of participatory processes in the watershed. These shortfalls are reflective of challenges in the promotion of collaborative processes in the US and elsewhere (Wondolleck & Yaffee, 2000; Akamani et al., 2015; Floress et al., 2015)

Finally, the analysis of the impacts of the CRWJVP on community capital assets showed both positive and negative impacts within and across the various capital assets. Some respondents noted that the CRWJVP's restoration program has had positive impacts on communities in the watershed, such as enhancement of ecological health and opportunities for recreation and nature-based tourism. However, disenchantment with the CRWJVP existed among some community members who saw the large tracts of land shifting from agricultural use to wildlife habitats and ecological restoration as harmful to the communities through decreased tax revenue and agricultural productivity. Others also believed that the restoration efforts were misguided, and that current management actions will irreparably damage the landscape. The contributions of the CRWJVP to the increased flood risk of communities and farmlands also received significant attention among key informants. Some key informants attributed the problems in the watershed to the narrow focus of the CRWJVP on the pursuit of ecological goals to the neglect of socio-economic considerations in the watershed. Contrary to the requirements of adaptive water governance (Huitema et al., 2009; Akamani, 2016), it appears that failure by the CRWJVP to embrace integrated management goals has resulted in unintended adverse impacts on the various capital assets that contribute to community resilience.

Limitations of the Study

This study used a qualitative research approach to analyze the relationships between two resource-dependent communities and ongoing transitions in water governance in the Cache River Watershed. The use of a qualitative research approach has provided a rich, context-specific understanding of the changing conditions of the two communities and how these changes are influenced by water governance mechanisms in the watershed. Although some of the findings from this study may be transferable to communities with similar attributes as those that were

studied, the use of a qualitative approach in this study does not allow for broad generalizations about the relationship between community resilience and adaptive water governance in other geographic contexts. Similar studies will be needed in other watersheds for a deeper understanding of these relationships.

The study also relied largely on the memory recall of key informants to generate historical data on changing community conditions since the establishment of the CRWJVP. As such, there is the possibility that some of the recollections of the communities' past were inaccurate. This problem was compounded by the difficulty that was encountered in identifying a major historical event during the inception of the CRWJVP that could have been used as a common reference point for research participants during the interviews. Nonetheless, it is expected that the use of multiple sources of data may have enhanced the accuracy of conclusions drawn from the findings of the study.

The duration of the fieldwork also extended beyond what was originally planned due to challenges in the recruitment of research participants for the interviews. I learned during the fieldwork that most research participants had heard about or participated in research projects in recent years which have not generated tangible benefits to community members. Mangun et al. (2009) described similar challenges in the recruitment of research participants for a study they conducted on local participation and knowledge of Cypress Creek National Wildlife Refuge. The authors identified research fatigue among community members from participation in previous socio-economic studies in the watershed as the source of the problem. Nonetheless, the extended duration of the fieldwork provided opportunities for a deeper understanding of the lived experiences of members of the communities.

Future Research Directions

As has been noted in previous sections of this thesis, the need for water governance to transition to more flexible and collaborative approaches has been well-documented, but actual implementation of these innovative governance mechanisms, such as adaptive governance is not widespread. Furthermore, the relationship between adaptive governance and community resilience is not well understood in the literature. This thesis sought to fill some of these knowledge gaps by exploring the relationship between community resilience and adaptive water governance using the Cache River Watershed as a case study.

Because this study took place in a small watershed in a rural region, and utilized data from just two communities within the watershed, it cannot be assumed that the findings from the study can be applied to watersheds of different sizes, settings, and context. Therefore, further watershed-level studies focused on transitions in water governance and their impacts on community resilience are needed to enhance the understanding of the theoretical relationship between adaptive water governance and community resilience. While this current study relied on community level qualitative data, the use of a mixed methods approach to generate data at multiple levels, such as the individual, household, community, and region in future studies should offer a holistic understanding of the complex relationships between communities and water governance.

Another interesting avenue for future research is the development of quantifiable indicators for assessing the general resilience of resource-dependent communities. Through the use of qualitative data, this current study has illustrated the multi-dimensional and dynamic nature of community resilience using the capital assets framework. Building on this thesis and previous works (e.g. Akamani & Hall, 2015), future research needs to focus on further exploring

the components of community resilience, as well as refining existing measurement instruments to enhance their validity and reliability.

Finally, to further enhance current understandings on the relationship between general and specified resilience in resource-dependent communities, future research needs to examine the factors influencing community responses to multiple drivers of change. In the case of the Cache River Watershed, a closer look at community responses to demographic change, economic shocks, land use change, and climate-related events, such as floods and droughts could generate additional insights to complement the focus of this current study on the process and outcomes of community response to the implementation of water governance initiatives. By analyzing the influence of contextual factors, such as capital assets, institutions and community history on community responses to the various drivers of change, a clearer picture might emerge on how the general resilience of communities influence their specified resilience to specific drivers of change.

Conclusion and Policy Recommendations

In this study, a qualitative research approach was employed to understand changing community conditions and how they are influenced by transitions in water governance in the Cache River Watershed. The results have highlighted the dynamic and multi-dimensional nature of community resilience, and the influence of multiple drivers of change on these community dynamics. While we proposed that transitions toward adaptive water governance could contribute to the resilience of resource-dependent communities, the results of the study suggest some benefits have been generated from the management efforts of the CRWJVP, but limitations in the program have also resulted in a range of adverse unintended consequences on

communities. In this final section, policy recommendations for enhancing social and ecological conditions in the watershed are presented and discussed.

During the fieldwork, key informants from both communities were asked about their recommendations for enhancing the well-being of their communities and the health of the local ecosystem in the watershed. The responses in both communities focused on the broadening of the management goals of the CRWJVP to address social concerns, such as flood control and tourism promotion, as well as the use of more effective mechanisms for managing ongoing conflicts among stakeholders in the watershed. Additionally, key informants in Karnak also identified avenues for autonomous community action to improve upon existing community conditions.

In both communities, key informants highlighted the need for a more effective mechanism for managing stakeholder conflicts in the watershed beyond current adversarial approaches that have resulted in a gridlock. Key informants expressed the hope that the use of collaborative and consensus-building approaches among farmers, the CRWJVP and other stakeholders in the watershed would contribute to improving upon the health of the ecosystem and its capacity to provide various benefits for community development.

“I think that we'd be a lot better off if we had less litigation going on ... It would help the community, it would help the Cache, it would help the state, it would help bring us a healthier ecological situation around here because we have these wetlands, and we need to utilize that, and utilizing that is going to bring in revenue for the community. We're already trying to get that now with the campground ... A healthier Cache is going to mean a healthier Karnak, and Ullin, and Tamms, and every other place around here where the Cache flows through. It's going to be more money for Vienna, it's going to

mean more opportunities for people in Cypress, it's going to mean more opportunities for people in Perks. The Barkhausen [Wetland] Center is wonderful...But we need places like that for people to go in and get educated about it. The more education that we have the better off we're going to be.” (Karnak, Education Representative)

“I think there's the big debate of whether or not they should kind of leave it a swamp, basically, or allow the river to flow. But the problem is, and I'm not saying anything bad about farmers, but the farmers that went in there and cut ditches here and there, and it's messed up the area. They want to drain their land: I understand that. But when you do that, it affects the whole ecosystem. And there has to be some kind of person or group in ... if you looked at drainage districts, all the drainage districts in the Big Creek Drainage District, it's comprised of the farmers. And they butt heads with Fish and Wildlife [USFWS] and Cache River. So there has to be a way that they can utilize and work out drainage issues and issues like that that affect the Cache River flow, and also the productivity of Cache. And that's where they're running into problems down here. You got one here, one here, and maybe one here, and there's no middle ground to totally utilize and promote the Cache River.” (Ullin, Long-term resident)

Key informants in both communities also called for a shift in the management priorities of the CRWJVP from an emphasis on ecological and hydrological concerns toward the integration of social considerations in their management goals. One avenue for such an integrated management approach that was mentioned during the interview is drainage management to reduce threats posed by floods.

“If we don't do something with Cache, and get it opened up, it's going to repeat itself. Because you know you're going to get these [floods]. You don't get them very often, but

anytime that [water] goes over the railroad tracks north of Ullin, I call that a major flood, and that has happened probably eight to ten times in the last 45 years. So it will happen, but it's usually on a four to five-year occurrence. But most of it could be alleviated if they would just open Cache [the Cache River] up and allowed this water to get out. And that's one of the problems I really have, is that they don't want to cut a tree down or pull a snag out because you might knock a home down for an Indiana bat or you might upset one of them. Well you know, I think an Indiana bat has their place, but I think human beings in Pulaski and Alexander [counties], their priorities are a lot higher than Indiana bat. And if the refuge has got 16 thousand acres I think they can have other places that the bat can live, other than right on the banks of Cache... Twenty-five years ago, we cleaned this bank off. And as you can see, 25 years later, it needs it again. And it needs both banks cleaned off ... So, I'm in negotiations right now trying to get the landowners to allow me to come in and do the work we need to do, at least clean this mile and a half, mile and three-quarters, get it opened up. And it is, as you see them, it wouldn't take much to remove them trees and get that bank cleaned up and clean it all the way to the levee there... but just by taking that off you really make the ditch 50% bigger and you don't have to disturb nothing. That's what's so frustrating to me.” (Ullin, Agriculture/ Big Creek Drainage Board Representative)

“Build us a big lake. That's what I'm looking for. It's all I'm asking. Not only would it be a great economical boost for our community, it would be a watershed so that when we do have flooding they can control the water coming in. It would be a big benefit that they could control the water in the lake to the point where they could actually keep us from flooding out... You're talking about the Cache; the Cache always went west. When they

came in here with the logging they made the Cache go both ways. So if they can come back in and control the water, it's going to be a benefit to everybody. The people to the east will get water, the people to the west won't get flooded. We definitely won't get flooded.” (Karnak, Local Government Representative)

The promotion of opportunities for recreation and tourism also received attention from key informants in both communities. In Ullin, key informants suggested the need for an integrated management approach by the CRWJVP that explicitly includes enhanced access to opportunities for recreation and tourism.

“I personally think we're at the point where they could open up more hunting areas, which would possibly bring in more revenue. I understand for a certain period of years you want to create a nature preserve for nature to thrive, but I think at some point you have to balance it all out as well or it's going to be thrown out of kilter, whether it's with fishing, hunting, waterfowl or deer.” (Ullin, Law Enforcement/Agriculture Representative)

“I think they [CRWJVP] do a wonderful job. I think the people there that work there, I think they work hard, they tried to promote it. I just think that there needs to be an expansion of it because it's so, it's such a beautiful area, and I think the only way you're going to expand it is to be able to better show off the particular areas, and unfortunately, that requires money. They do have a lot of nice places that you can go and see, but there's a lot of pretty nice spots that you can't get to, and that would be my biggest thing, is to try to get more places that, where you can go and see, and see more of the area. But again, that takes money.” (Ullin, Long-term resident)

Additionally, some key informants in Karnak offered suggestions on measures that could be taken by community members and their local leadership to improve the attractiveness of the community, both as a destination for tourists, and as a place for people to live and work. One such strategy is the enforcement of local land use regulations as a means of improving the aesthetics of the community.

“I think the biggest thing would be enforcing some of the ordinances that I know were there as far as property clean-up and making the town more attractive to visitors. First impressions mean a lot, so when people come in, drive through the town, it's a very busy town. It really is. I mean there's a lot of traffic that comes through there on a daily basis. So, making things more attractive, making people want to stop, I think those things could ... But it needs to go further than just the main street in order to keep your population ...” (Karnak, Small Business/ Education Representative)

In all, the recommendations provided by key informants on the management goals and decision-making processes of the CRWJVP are very consistent with the key features of adaptive water governance. In a related study, Hancock (2017) found that although the CRWJVP has recently evolved to embrace adaptive management in its restoration efforts, current management practices can largely be characterized as passive adaptive management rather than active adaptive management. Other studies have also highlighted how various conflicts continue to impede solutions to complex problems, such as the reconnection of the Lower and Upper Cache Rivers (Akamani et al., 2016; Behnken, et al, 2016). Moving towards an adaptive governance approach would likely help to address many of the concerns that the respondents of this study expressed regarding the impacts of the CRWJVP on communities, as well as provide an enabling environment for the implementation of active adaptive management.

An adaptive governance approach would necessitate a fully polycentric network which will include the representation of stakeholders, such as community members and other interest groups at various levels. Such local representation can promote a bottom-up management approach and inform decision-making through the integration of local knowledge and scientific knowledge. An emphasis on managing conflicting values and knowledge uncertainties through analytic deliberation in adaptive water governance could also help address the persistent conflicts in the watershed (Akamani et al., 2016; Hancock, 2017). Such a transition would likely contribute to enhancing the resilience of communities and ecosystems in the watershed.

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APPENDICES

APPENDIX A

Community Member Interview Guide

- 1) How would you describe the community that you're a part of?
- 2) How satisfied are you with conditions in your community?
- 3) What changes have you seen in the past two decades or so?
- 4) Do you think these changes have been good or bad for your community? Why?
- 5) What kinds of things would you like to see happen in your community that would make it better?
 - a. Do you think these things are achievable under current conditions?
- 6) What kinds of threats exist that will shape your community in the future? How prepared is your community in dealing with these threats?
- 7) What kind of effect does climate change have on your community, if any?
- 8) What types of opportunities exist to improve your community's well-being?
- 9) Do you think things could be done differently to improve any conditions in your community? If so, what?
- 10) The way we define community resilience is the "existence, development, and engagement of community resources by community members to thrive in an environment characterized by change, uncertainty, unpredictability, and surprise." Based on this definition, do you think your community is resilient?
- 11) What does the Cache River and the wetlands mean to you? What do they mean to your community?
- 12) Can you tell me what you know about the Cache River Joint Venture Partnership?

- 13) How involved are people in your community in the JVP's management activities? In what ways are the people in your community involved with the JVP and its projects?
- 14) Are there any barriers to participating in management activities?
- 15) How do you feel about the Joint Venture Partnership and their restoration efforts in the Cache?
- 16) In the past, do you think that community members' needs and concerns have been sufficiently represented in regards to the restoration efforts from the JVP? More recently, has it gotten better, worse, or the same?
- 17) How has the JVP/its entities impacted things like {the local economy, jobs, education, outdoor opportunities, relationships with other citizens, local government}?
- 18) Do you think the JVP's efforts have helped your community overall?
- 19) How have the efforts of the JVP affected the health of the Cache River and the surrounding areas?
- 20) What suggestions do you have for managing or maintaining the well-being of this community?
- 21) Are there any other comments you'd like to make, or anything that you feel my questions did not adequately address?

APPENDIX B

JVP Member Interview Guide

- 1) What is the purpose of the JVP?
- 2) What is the role of your organization in the JVP?
- 3) What do the Cache River and the wetlands mean to you? What do they mean to your organization?
- 4) How would you describe socio-economic and ecological conditions of the communities in the CRW?
- 5) In what ways are the people in the Cache River watershed involved with the JVP and its projects?
- 6) What is your assessment of the Joint Venture Partnership and the restoration efforts in the Cache?
- 7) In the past, do you think that community members' needs and concerns have been sufficiently represented in regards to the restoration efforts from the JVP? More recently, has it gotten better, worse, or the same?
- 8) Do you think the JVP's efforts have helped local communities? In what ways has the JVP impacted the well-being of the communities?
- 9) How have the efforts of the JVP affected the ecological health of the Cache River and the surrounding areas?
- 10) In what ways do you think the JVP could make a better contribution to both the well-being of local communities and the health of the watershed?
- 11) What threats and/or opportunities exist at the community level? How prepared are the communities to deal with them?

12) Are there any other comments you'd like to make, or anything that you feel my questions did not adequately address?

APPENDIX C
Participant Information/Cover Letter

Dear _____:

I am a graduate student seeking my Master's degree in the Department of Forestry at Southern Illinois University Carbondale.

You were selected to participate in this study because of your knowledge of the Cache River area and/or subject matter of this study.

The purpose of this interview is to determine your attitudes toward the Joint Venture Partnership (JVP) and its restoration efforts in the Cache River watershed. In addition, there are a few questions that ask your opinion about the JVP, the local community, levels of participation, etc.

The interview will take no longer than 60 minutes to complete. All your responses will be kept confidential within reasonable limits. Only people directly involved with this project will have access to the responses.

Participation in this study is voluntary. Only the lead researcher (Dr. Akamani) and myself will have access to any identifying information collected at the time of the interview. Names will be replaced with an assigned code (i.e. JVP-001), and no identifying information will be included in the final data report. All other data collected will be destroyed following the conclusion of this study.

Questions about this study can be directed to me or to my supervising professor, Dr. Akamani, Department of Forestry, SIUC, Carbondale, IL 62901-4411.
Phone (618) 453-2469.

Thank you for taking the time to assist me in this research.

Rachel Sheely
(618) 615-5749
rsheely@siu.edu

This project has been reviewed and approved by the SIUC Human Subjects Committee. Questions concerning your rights as a participant in this research may be addressed to the Committee Chairperson, Office of Sponsored Projects Administration, SIUC, Carbondale, IL 62901-4709. Phone (618) 453-4533. E-mail: siuhsc@siu.edu

APPENDIX D
Consent Form (Form C)

My name is Rachel Sheely. I am a graduate student at Southern Illinois University-Carbondale.

I would like to request your participation in my research study. The purpose of the study is to assess community attitudes toward sustainability and the impact that the Joint Venture Partnership has had on communities in the Cache River Watershed.

Participation is voluntary. If you choose to participate in the study, it will take approximately 60 minutes of your time. You will be interviewed in a mutually agreed upon location, and the conversation will be recorded with an electronic recording device. I may also ask you for recommendations and contact information in order to recruit additional participants.

All your responses will be kept confidential within reasonable limits as well as your personal preference. Only those directly involved with this project will have access to the data.

If you have any questions about the study, please contact me, or my advisor:

Rachel Sheely
(618) 615-5749
rsheely@siu.edu

Dr. Kofi Akamani
(618) 453-2469
k.akamani@siu.edu

“I agree _____ I disagree _____ to have my responses recorded on audio/video tape.”

“I agree _____ I disagree _____ that Ms. Sheely may quote me in her paper”

I understand the purpose of this study is to determine the impacts of the Joint Venture Partnership on community resilience in the Cache River watershed.

I understand my participation is strictly voluntary and may refuse to answer any question without penalty. I am also informed that my participation will last approximately one hour.

I understand that my responses to the questions will be audio/videotaped, and that these tapes will be transcribed/stored and kept for 180 days in a locked file cabinet. Afterward, these tapes will be destroyed.

Thank you for taking the time to assist me in this research.

Participant Signature and Date

This project has been reviewed and approved by the SIUC Human Subjects Committee. Questions concerning your rights as a participant in this research may be addressed to the Committee Chairperson, Office of Sponsored Projects Administration, SIUC, Carbondale, IL 62901-4709. Phone (618) 453-4533. E-mail: siuhsc@siu.edu

APPENDIX E

Coding Manual

Community setting and context: Description of the current conditions (both positive and negative) of the communities in the Cache River watershed

- Social Capital: Networks of social relationships, connections, and cooperation amongst community members and between communities
- Natural Capital: Services and resources provided by the ecosystems in watershed
- Human Capital: Education, health, intelligence, knowledge, skill, and general well-being of individuals
- Physical Capital: The built environment that exists within each community, such as transportation networks, housing, educational and health facilities.
- Economic Capital: The flow of money, goods, and services; financial and monetary institutions, lenders, and borrowers.
- Institutional: Laws, rules, policies, and governmental factors that dictate the structure and function of communities and the watershed
- Challenges to Social Capital: instances that inhibit the existence, development, or use of social relationships, connections, and cooperation amongst community members and between communities
- Challenges to Natural Capital: instances that inhibit the existence, development, or use of services and resources provided by the ecosystems in the watershed
- Challenges to Human Capital: instances that inhibit the existence, development, or use of education, health, intelligence, knowledge, skill, and general well-being of individuals

- Challenges to Physical Capital: instances that inhibit the existence, development, or use of the built environment that exists within each community, such as transportation networks, housing, educational and health facilities.
- Challenges to Economic Capital: instances that inhibit the existence, development, or use of money, goods, and services, as well as financial and monetary institutions, lenders, and borrowers.
- Institutional Challenges: challenges created by laws, rules, policies, and governmental factors that dictate the structure and function of communities and the watershed, or challenges due to a lack of institutional structure

Community dynamics: Description of changing community conditions and their associated causes and consequences

- Patterns of change: Description of positive and negative changes in community conditions
- Threats: Socio-economic, natural, or other types of disasters, trends, or events that could cause a decline in community well being
- Opportunities: Recognition of existing potentials for improving community well being
- Adaptive capacity: Perceived ability of communities to utilize, or actual utilization of existing resources in a manner that promotes resilience

Community participation: Interactions between communities and JVP members in the management of the Cache River watershed

- Knowledge: Community members' awareness of the JVP and its role in the management of the Cache River watershed

- Motivation: Expected benefits that influence community members' intention to be involved in the management of the Cache River watershed
- Involvement: The extent and ways in which community members participate in the management of the Cache River watershed
- Participation barriers: Factors inhibiting community involvement in the management activities of the JVP

Outcomes: Community members' perceived outcomes associated directly or indirectly with the management programs of the JVP in the Cache River watershed

- Human capital outcomes: Effect of JVP's presence on education, health, intelligence, knowledge, skill, and general well-being of individuals
- Social capital outcomes: Positive perceived effects of JVP's presence on networks of social relationships, connections, and cooperation amongst community members and between communities
- Economic capital outcomes: Positive perceived effects of JVP's presence on the flow of money, goods, and services; financial and monetary institutions, lenders, and borrowers
- Natural capital outcomes: Positive perceived effects of JVP's presence on services and resources provided by the ecosystems in watershed
- Physical capital outcomes: Positive perceived effects of JVP's presence on the built environment that exists within each community
- Institutional outcomes: Positive perceived effects of JVP's presence on laws, rules, policies, and governmental factors that dictate the structure and function of communities and the watershed

- Negative human capital outcomes: Negative perceived effects of JVP's presence on education, health, intelligence, knowledge, skill, and general well-being of individuals
- Negative social outcomes: Negative perceived effects of JVP's presence on networks of social relationships, connections, and cooperation amongst community members and between communities
- Negative economic outcomes: Negative perceived effects of JVP's presence on the flow of money, goods, and services; financial and monetary institutions, lenders, and borrowers
- Negative natural capital outcomes: Negative perceived effects of JVP's presence on services and resources provided by the ecosystems in watershed
- Negative physical capital outcomes: Negative perceived effects of JVP's presence on the built environment that exists within each community
- Negative institutional outcomes: Negative perceived effects of JVP's presence on laws, rules, policies, and governmental factors that dictate the structure and function of communities and the watershed

Non-JVP influences: Other factors outside of JVP management actions that have influenced the social and ecological outcomes in the management of the watershed

Other: Data that does not precisely fit in any of the previous categories

VITA

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