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I am submitting herewith a dissertation written by Jamey L. Pavey entitled “The Challenge of Realizing Sustainable Natural Resource Management on Private Lands: Problems and Promise.” I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillments of the requirements for the degree of Doctor of Philosophy, with a major in Natural Resources.

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(Original signatures are on file with official student records.)

# THE CHALLENGE OF REALIZING SUSTAINABLE NATURAL RESOURCE MANAGEMENT ON PRIVATE LANDS: PROBLEMS AND PROMISE

A Dissertation
Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville

Jamey L. Pavey
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# DEDICATION

This dissertation is dedicated to my husband, Jason Pavey, for his support and patience over the past four years; and to my parents, Don and Paula McDaniel, for instilling in me the importance and value of education and the confidence to pursue my dreams.

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# ABSTRACT

Today's natural resource problems are more complex than ever and many have yet to be effectively addressed in the United States by regulations or management policies. The challenges presented by these problems require new approaches to the governance of natural resources in the United States. These approaches must recognize that the governance of natural resources is not only a technical task, but a social process. The management of natural resources on private lands presents a unique set of problems and a unique set of opportunities to provide environmental benefits. However, without adequate incentives, landowners are unlikely to manage their land to provide important ecosystem services.

Processes have been developed and applied that incorporate participatory decision-making processes, involve new roles for state and federal agencies, and are flexible and adaptable to local situations. These processes offer hope for the future of natural resource management on private lands by encouraging social learning and cooperative management.

Following the determination that no such processes were active in the Deer Lodge community in Morgan County, TN, and that important natural resource concerns were present, researchers initiated an interactional community development effort in this community. Monthly meetings were held in the community for a year, and a grant proposal was developed to pursue the identification of a product that could be locally produced and marketed. A qualitative case study approach, utilizing key informant and focus group interviews and participant observation, was employed to describe and analyze the effort. It was found that gaining entry into the community and building trust between participants were key factors in the community development effort.

The existence of significant natural resource problems in the Dry Creek watershed in West Tennessee led to the investigation of the institutional causes of these problems. A case study approach utilizing key informant, focus group, and semi-structured interviews, as well as document review, was employed. The Interactional Analysis and Development (IAD) framework was used to interpret results. It was found that existing institutional arrangements have resulted in outcomes that are not equitable or adaptable and do not ensure accountability. It is recommended that governance mechanisms be established at the watershed scale to address these outcomes.

This dissertation contributes to the growing literature on alternatives to conventional natural resource management and addresses the special need for approaches appropriate for utilization in privately owned landscapes.

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# PART 1: INTRODUCTION

Private land ownership is an important part of American history, constitutional law, and our way of life. When making decisions regarding their land, private landowners respond to a number of cultural norms as well as government and market rules. With these norms and rules, society has entrusted the future of many of the nation's natural resources to private landowners. This dissertation focuses on private lands and the natural resources found on those lands and especially the forces impacting their use and conservation.

I will begin first with a landowner's story. This is not the story of any single landowner, but has been composed based upon the stories of several different landowners. By starting in this way, I hope that the problems and issues discussed throughout the rest of the dissertation can be understood more clearly from the personal perspective of someone directly affected by them.

## Joe's Story

My name is Joe, and I own 200 acres along Dry Creek in Hardeman County, Tennessee. I inherited the land from my parents and have lived on it my entire life, except for when I went away to college in Knoxville. I met my wife there, and luckily she was willing to move out here. I farmed when I was younger, but I retired about 10 years ago. It was just too hard to keep going by myself, and my kids have all moved to Memphis or Nashville. Now I rent out about 150 acres to a couple of cotton farmers from Haywood County, north and east of here, who also rent several other farms around here. I think they farm almost 5000 acres all together. That would have been unimaginable back in my day, but the equipment

they have now days is so advanced, expensive, but it seems to get the job done, and quickly.

The other 50 acres I have is wooded, but it's now mostly swamp. I used to hunt back there all the time, but the beavers came in a while back and have flooded a lot of it. I busted up their dams for a couple of years but have given up. They just keep coming back. I'm not sure where they came from. Somebody told me that the state wildlife agency brought them in. I don't understand why they would have done such a thing. They've been nothing but trouble to me and everyone else along this creek. If the wildlife folks were responsible, they should do something about it. I thought about having one of those state guys come out to see if there's anything that I could get money to do with that 50 acres, but I'm not sure I trust them, especially if they're the ones who brought in those beavers.

I've got this friend, Bill, who has land down on Clover Creek closer to the Hatchie. Now, his place is on the original creek, not on that ditch they dug back in the 1940s or whenever. That ditch is all clogged up now in a bunch of places. I think a lot of the water is back in the original creek now. That whole thing was such a mess. They thought this ditch would help when it flooded, and it did for a while, but I think it's caused more harm than good.

Anyway, back to Bill…I went hunting over there last week. He puts out food plots for deer and we are starting to see more wild turkey around. He's got real problems with sand on his property. When the creek floods, all this sand gets dumped around his trees. Some of his trees are even starting to die from it, and he has some nice hardwoods there. He had to cut some last fall because they

were dying. He didn't really want to cut them—didn't really think they were quite big enough—but he didn't have much of a choice if he didn't want to lose all that money.

I have my own ideas about where all that sand comes from, but I'm no expert. I've seen places in the hills where there are big gullies. It looks like they just start as ditches or something, but over time they get huge—some big enough to fit a bus, probably. All that soil has to go somewhere, right? I figure it's ending up in Bill's woods. Also, I've noticed when I cross the bridge over Dry Creek up on the highway that the banks keep getting taller. Well, really the creek bed's getting deeper. I figure that's a source of the sand too. Who knows, the creek may still be moving around all the stuff that eroded when we used to till all the fields.

The creeks have gotten a lot cleaner since all the farmers started using no-till. Some folks worry about all the chemicals they put out, but I figure they're alright. I used them for 50 years and I'm doing OK. I think the stuff they make now is probably a lot safer than what I used. An older neighbor died last year of Parkinson's. His son thinks that all the years he fiddled with weed killers and other chemicals is the reason he got sick. That seems farfetched to me, but his son says that chemical exposure and Parkinson's are linked. I don't know.

The community here has changed a lot since I was young. I used to go with my dad down to the little farm store in town, especially on rainy days. I think every farmer around was usually there, talking about the weather and the crops. That store closed about 15 years ago, just after the post office shut down. Now I

don’t see anyone really, except at church. I really miss that, even though I don’t farm anymore. A lot of new folks have moved in too. There’s this guy from Memphis building a huge house just down the road from me. There haven’t been any subdivisions go in around here yet, but I’m sure they’re coming. There’s a couple up in Madison County not far from here. I know the guy who used to own and farm the land there. Those developers offered him so much money for that land that he would have been crazy not to sell it. Some of his neighbors were mad, but they would have done the same thing if they’d had the chance.

One of the things I really love about living here is fishing on the Hatchie River. I’ve been fishing it my whole life. It’s changed a lot too—seems like everything’s changing, doesn’t it? The river’s not nearly as deep as it used to be. Steamboats used to come up to Bolivar back in the old days. No hope of that now. There are some places I can’t even get my little boat through anymore, it’s so shallow. The sand is there too. There’s sandbars that build up and almost block the channel in some spots. There’s one at the mouth of Clover Creek that gets real bad. It gets blown out every now and then when it floods. I always get a little sad now when I go out on the river because, even though it’s still beautiful, it’s just not what it used to be. And I’m afraid that it’s only going to get worse. I worry that my great grandkids won’t have the opportunity to experience the Hatchie the way I have.

I don’t know what can really be done about the sand that’s causing trouble for my friend and for the Hatchie. I also don’t know what can be done about those

beavers, but it seems like there should be something that someone can do. I'm afraid it may already be too late.

## Issues of Concern

Joe's story is one of a private landowner, but it is also one of a community, and ultimately, a way of life. Though the specific natural resource problems may vary from place to place, the roots of these problems are very similar. Additionally, pressures from development, declines in local communities, and the consolidation of farming operations are larger economic and social trends that are evident throughout rural America.

Historically, the goal of natural resource management in Western cultures has been to control and dominate nature and natural processes (Holling and Meffe 1996). We have been quite successful at this enterprise over the short term, but the long term effects on ecosystems and society have not always been beneficial, as Joe's friend Bill would attest. Additionally, the conventional approaches to natural resource governance have been based on the "expert" model, in which scientists and resource professionals make management decisions with little or no input from local residents (Berkes 2004; Woodhill and Roling 1998).

Natural resource governance is beginning to be understood as not just a scientific or technical undertaking, but a social process, in which the values and insights of citizens matter, and their involvement is crucial to the long-term sustainability of natural resources. This dissertation is an effort to further this

understanding and to examine ways in which citizens can be encouraged and inspired to become active participants in the development of the rules that affect their everyday lives. This dissertation also examines the roles and rules of government and market forces influencing private lands and how they might be adjusted for more sustainable natural resource use. This dissertation is an effort to figure out how to address Joe's concerns about his land and his community in a meaningful way.

## Overview of the Dissertation

The remainder of this dissertation consists of three manuscripts (Parts 2-4) and an overall conclusion (Part 5). In Part 2, the results of a literature review are presented in which current thought is summarized regarding: 1) the major causal factors leading to current natural resource governance problems, and 2) recent innovations in addressing these problems. An objective of this review and discussion is to establish a "current thought" literature base from which to view the empirical cases described in Parts 3 and 4. It is proposed that there are four characteristics of natural resource governance in the United States that have contributed to the emergence of complex environmental problems. These include the following:

- Failure to recognize cycles and interconnections in nature or to acknowledge the importance of these natural systems
- The influence of anthropocentrism, the paradigm of dominance, and reductionism
- The limited capacity of communities to address natural resource issues
- Failure of market forces to provide adequate incentives for conservation

While these are significant obstacles to overcome, recent innovations in policy approaches provide promise for the future. The literature related to five of these approaches is reviewed. Three characteristics were found to be common across the approaches: 1) they are participatory processes, 2) they involve new roles for agencies, and 3) they are flexible and adaptable. While the management of natural resources on private lands presents unique challenges, these processes offer the opportunity to overcome these challenges, potentially leading to the development of incentives for the provision of ecosystem services and cooperative management across properties. Such incentives are needed to ensure the sustainable management of these lands now and in the future.

Parts 3 and 4 represent the empirical research conducted for this dissertation regarding first the potential of community development as a means to address change in a rural community (Part 3) and second the factors influencing private lands use in a rural watershed (Part 4). In Part 3, a participatory research approach to community development is discussed in which researchers worked with rural community members and natural resource professionals in a collaborative learning group. The interactional approach to community development (one of the approaches discussed in Part 2) was chosen (Wilkinson 1970; 1999) and applied in the Deer Lodge community of Morgan County, TN.

In this participatory research project, key informant and focus group interviews were first utilized to obtain background information regarding the

communities and natural resource issues present in the area. Several themes emerged from these interviews, including a concern about potential development pressure and a hope for healthy, profitable forests in the area. Later, a community development effort was initiated in the community of Deer Lodge, with a goal of building relationships within the community and assisting the community in planning for the future. Monthly meetings were held in the community for a year, and a grant proposal was developed to pursue the identification of a product that could be locally produced and marketed. The results of the case study indicated that gaining entry into the community and building trust between participants were key factors in the community development effort.

In Part 4, the results of an institutional analysis of private land use are discussed. The existence of significant landscape-scale resource problems in the Dry Creek watershed led researchers to investigate the ecological, social, and economic roots of these problems in an effort to determine how best to address the problems. Semi-structured and focus group interviews, along with document review, are used to obtain data regarding the physical environment, the local community, and the rules influencing private land use in the watershed. The institutional analysis and development (IAD) framework is used to describe the ways in which land use is influenced by these three factors. The current institutional arrangement is evaluated according to its efficiency, equity, accountability, and adaptability. Significant problems with the latter three of these were found. It is recommended that governance mechanisms be established at the watershed scale to address these outcomes. However, integration across all

levels of governance is required to ensure the enforceability of these mechanisms.

Finally, Part 5 is an overall conclusion to the dissertation. The case studies in Parts 3 and 4 suggest that there are significant obstacles to sustainable natural resource management on private lands including:

- Problems with equity
- Problems with accountability
- Problems with local governance and accountability
- Reductionism and the “expert” model of management

The processes described in Part 2 offer means by which to overcome these obstacles. However, it is concluded that there are two primary sets of relationships that need to be nurtured or redefined in order for these processes to be effective. The first is relationships among individuals involved in management across the landscape, including private landowners, stakeholders, and agency personnel. Changes in these relationships require new roles for agency personnel, citizens, researchers, educators, legislators, and the civil sector. The second is relationships between these individuals and nature. Changing these relationships will not be easy, as it will require major shifts in worldviews.

Consent forms, interview protocols, and other information are included in Appendices A through D at the end of the dissertation.

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# PART 2: WHAT'S WRONG HERE? THE PROBLEMS AND PROMISE OF NATURAL RESOURCE GOVERNANCE

## Introduction

Today's natural resource problems are more complex than ever and many have yet to be effectively addressed in the United States by regulations or management policies. Humanity's desire to manipulate and control natural systems is at the heart of many of these problems. The long-term effects of such manipulation have been detrimental in unforeseen ways. Examples include the damming of major rivers, irrigation projects, and the channelization of rivers. Each of these manipulations has had significant impacts on aquatic species and on ecosystems. These problems are difficult to address because it is often economically, physically, and/or politically difficult or impossible to "undo" what has been done.

Other problems involve trade-offs between economic and environmental benefits. These trade-offs affect the livelihoods of individuals and communities, as well as the sustainability of the global ecosystem. Such decisions are rarely clear cut and intense conflicts often develop, as they did in the "Owls vs. Jobs" conflict in the Pacific Northwest in the 1990s. The conversion of farm and forestland for development is also a problem involving trade-offs between economic and environmental values associated with resources. These working lands provide important public benefits, such as environmental and aesthetic amenities, for which landowners are not compensated (Shutkin 2000; Wolff and Hirschhorn 2001). Today's agricultural economy, combined with urban sprawl, results in a situation in which economic potential through development is much

higher than alternative land uses. According to a 2002 study by the USDA Natural Resources Conservation Service, cropland decreased by 51.2 million acres between 1982 and 2002, while developed land increased by 34.5 million acres (USDA Natural Resources Conservation Service 2002). The loss of cropland represents the loss of land with the potential to provide many environmental benefits, and the increase in developed land represents an increase in land that has been cleared and paved over, further exacerbating environmental problems.

While federal and state regulations have made significant strides in the control of point source pollution, pollution from non-point sources is much more difficult to regulate. This type of pollution cannot be traced back to a single source, making it very difficult to regulate. Non-point source pollution from agriculture and urban runoff is now considered by the US Environmental Protection Agency (EPA) to be the country's largest water quality problem (U.S. Environmental Protection Agency 2000). The large number of privately owned parcels from which pollution could originate makes it nearly impossible to identify the sources.

As stated previously, these complex problems are rooted in humanity's desire to manipulate and control nature. In order to address these problems, new approaches to natural resource policy are being developed and applied in the United States and around the world. These approaches offer ways to overcome many of the barriers to effective natural resource governance.

The objectives of this paper are threefold: 1) to discuss characteristics of the political, social, and economic systems in the United States that have contributed to the development and persistence of natural resource problems; 2) to review the literature on five approaches to natural resource governance that have been advanced as alternatives to the conventional paradigm of management and regulation; and 3) to discuss potential applications of these approaches to natural resource problems on private lands. The paper provides an introduction to the problems and processes that will be discussed throughout the remainder of the dissertation and establishes a "current thought" literature base from which to view the empirical cases described in Parts 3 and 4.

## How Did We Get Here?

There are several factors that have contributed to the development and persistence of these natural resource problems in the United States. The following four characteristics of natural resource governance in the United States have contributed to the emergence of complex environmental problems:

- Failure to recognize cycles and interconnections in nature or to acknowledge the importance of these natural systems
- The influence of anthropocentrism, the paradigm of dominance, and reductionism
- The limited capacity of communities to address natural resource issues
- Failure of market forces to provide adequate incentives for conservation

**Failure to Recognize Cycles and Interconnections in Nature or to Acknowledge the Importance of these Natural Systems**

Almost 35 years ago, Commoner (1971) presented four basic laws of ecology and contended that the failure to observe these laws accounted for many of our environmental problems. Commoner's (1971) first law of ecology is that "Everything is connected to everything else." This recognizes the fact that nature is composed of complex interconnected systems that exist at various overlapping spatial and temporal scales (Lafferty and Meadowcroft 1996). This law is important because the causes and the consequences of environmental problems are often seen and disconnected across space and time (Holling et al. 2002).

Many environmental and natural resource policies address a single media, such as water, and do not account for the systems that tie water, air, soil, plants, and humans together. These policies are also implemented by many different agencies, making it difficult to coordinate management efforts. Additionally, most policies governing the use and management of natural resources are established according to political jurisdictions at the local, state, or federal level. This makes it difficult to effectively manage ecosystems, whose boundaries do not coincide with political borders (Durant et al. 2004; Folke et al. 1998; Glasbergen 1996; Holling et al. 2002; Holling and Sanderson 1996; Shutkin 2000).

Change can occur very rapidly in natural systems, and historically, natural resource policies have been irresponsive to these changes. Policies are often formulated at the federal or state level and lack mechanisms to adjust for this

rapid change in natural systems. Also, the policies often lack mechanisms to adapt to the wide variety of conditions that exist at local levels (Fiorino 2004).

### The Influence of Anthropocentrism, the Paradigm of Dominance, and Reductionism

The worldview traditionally held by most people of the modern developed world is an anthropocentric one, in which the needs of humans are valued more highly than non-human values. Katz (1995) argues that the origins of conventional command-and-control modes of natural resource management can be traced back to the Bible, where, in Genesis, God instructs Adam and Eve to "have dominion…over every living thing that moves upon the Earth." (Genesis 1:28). This exemplifies the anthropocentric viewpoint, which has dominated and guided Western culture during the past several centuries. Katz (1995) goes on to state, "…the anthropocentric attitude toward the use of natural resources is embedded so deeply into the Western philosophical and religious tradition that it is rarely articulated, examined, or criticized" (p. 103). This feeling of having a "God-given" right to dominate and subdue nature serves as a philosophical basis for conventional natural resource management. It is this worldview, along with the need to dominate nature in order to provide resources and services for humans, that led European settlers in the US to clear forests, till prairies, and harness rivers (Katz 1995).

The strong emphasis on private property rights in the United States is also reflective of our anthropocentric attitude. Landowners are entitled to make decisions about their land based on their personal values and interests. There

are limited mechanisms to provide incentives for landowners to manage natural resources for societal benefits, such as carbon sequestration, recreation, or aesthetics (Richardson 2000; Shutkin 2000). As Gibson et. al. (2002) state, "Holders of private property rights, of course, have no a priori reason to conserve the resources they own. Economic theory predicts that they will maximize the return on their resource. This means that if a forest is more valuable to them as timber than as standing forest, trees will be cut down, regardless of the costs that may accrue to society" (p. 209). In addition, the conventional institution of private property rights fails to acknowledge an ethical responsibility toward the environment (Beatley 1994).

Nature has also been viewed from a reductionist viewpoint in Western societies. Reductionism holds that nature functions as a machine whose parts can be studied and controlled, that the purpose of nature is as the supplier of goods for humans, and that the value of natural resources is reliant on humans' ability to put them to use (Holling et al. 1998; Lindsay 1995). Thus, the conventional approach to natural resource management has addressed the needs and desires of humans (especially those in power), sometimes at the expense of the environment and society at large.

Many natural resource management policies, rooted in reductionism, have dominated and controlled nature by reducing variability within natural systems (Holling et al. 2002). The widespread channelization projects of the 20$^{th}$ century are one example of this manifestation of reductionism. Many rivers and creeks were straightened and deepened to speed the drainage of flood waters off of

agricultural land. However, the long-term impacts of these projects have proved to be very detrimental, with sedimentation emerging as a major problem. Reducing the variability within the river channels has reduced the ability of the system to compensate for natural changes.

Policies based on reductionism violate Commoner's (1971) third law of ecology, which is that "Nature knows best." He goes on to state, "…any major man-made change in a system is likely to be detrimental to that system" (Commoner 1971, p. 41). This fact has been widely ignored by resource managers, resulting in many unintended consequences and much irreversible damage to natural systems.

### The Limited Capacity of Local Communities to Address Natural Resource Issues

Priorities for the governance of natural resources are typically determined at the national and state levels, but policy implementation occurs across many jurisdictions. While this has resulted in the protection of many important resources, it has also produced inflexible policies that do not account for variations in ecosystems or local community values (Daniels and Cheng 2004). The "expert" model of management, in which agency personnel are viewed as being the authorities on management practices due to their scientific training, has also been predominate over the past century (Berkes 2004; Woodhill and Roling 1998).

The tendency of policies to be imposed from the top levels of government leaves little opportunity for local communities to be involved in the policy

decisions affecting natural resources. These conventional modes of management, combined with economic and social trends, have produced citizens who are generally not engaged in governance. They have not been empowered to participate in decisions, and they do not feel that they can make a difference (Shutkin 2000). Social capital, which can broadly be thought of as that quality in a community which enables residents to effectively communicate and address issues of local importance, has declined throughout the U.S. (Putnam 2000; Shutkin 2000), resulting in communities that are unable to effectively address local natural resource issues.

Berkes (2004) notes that the scientific uncertainty involved in natural resource decision making demands cooperation between agencies and local residents. He contends that what is needed is to pool knowledge from all available sources in order to gain a better understanding of complex ecosystems. The “expert” model of management does not encourage such cooperation between professionals and local residents (Berkes 2004; Woodhill and Roling 1998).

Conventional natural resource management regimes on public lands have resulted in widespread problems associated with the relationship between natural resource management agencies (e.g. USDA Forest Service, Bureau of Land Management, etc.) and the public. In the past, managers were not encouraged to incorporate local culture or value systems into management decisions. Such conventional approaches to natural resource issues “too often produce results grounded in adversarial rather than deliberative processes” (Durant et al. 2004,

p. 4). This has led to contentious conflicts in communities adjacent to public land and widespread distrust of management agencies and the government within residents of these communities (Hays 1959; Wondolleck and Yaffee 2000).

**Failure of Market Forces to Provide Adequate Incentives for Conservation**

The management of lands for the purpose of resource extraction, via agriculture, mining, or forestry, often results in negative environmental consequences due to the erosion of soil, the leaching of chemicals, and other processes. These negative externalities "have been treated as a necessary and inevitable part of land use and production; their costs have thus been assumed away, neither borne by producers nor passed on to consumers" (Shutkin 2000, p. 57). Rather, the costs, both present and future, of these negative externalities (e.g. water pollution, air pollution) are borne by society (Brook 2001).

Markets do not exist for most environmental benefits that are or could be derived from forests and agricultural land. Such benefits include wildlife habitat, biodiversity preservation, carbon sequestration, and water quality protection. These benefits constitute positive externalities, whose costs are borne by producers. However, without markets for these services, producers have few incentives to provide them (Edwards and Sharp 1990; McKean 1996; Pierce 1996).

The failure of market forces to provide adequate incentives or compensation for providing environmental services has resulted in management that often produces more negative externalities than positive ones. Additionally,

this failure of market forces to provide incentives for conservation, combined with recent trends in agricultural and development economies, has contributed to the conversion of much privately owned forest and agricultural land to development. This loss of open space has negative social and environmental implications. In order to address current natural resource problems, institutions must be established by which private landowners are compensated for providing environmental benefits to society (McKean 1996).

## What Can Be Done about these Problems?

Several innovative approaches to the governance of natural resources have been developed in recent years to address the shortcomings of conventional natural resource policy. These approaches go by many different names and originate in many different disciplines. In this paper, five of these concepts, each of which has its roots in a different discipline, will be discussed. These approaches were selected to provide an overview of the approaches from the perspective of different disciplines. The concepts to be discussed are as follows:

- Collaborative learning
- Civic environmentalism
- Resilience-building management
- Collective action
- Interactional community development

These different approaches to natural resource governance share many common elements, but also have important differences. This section will offer a description of each approach, based upon the writings of key researcher(s), and

if appropriate, a brief discussion of similar approaches utilized by other researchers or practitioners. Additionally, commonalities across the concepts will be highlighted.

Such a discussion is useful because it highlights the commonalities and differences among the concepts, clarifying their meaning and application. Additionally, natural resource professionals, non-profit groups, and other stakeholders can utilize these descriptions to ascertain whether or not one of these approaches could be used to address natural resource problems faced by the communities in which they work. It should be noted that not all problems and situations are suited to these new approaches to natural resource governance. Considerable thought and deliberation should go into the decision about whether or not to initiate an effort based on these or similar processes.

**Collaborative Learning**

According to Daniels and Walker (2001), the foundations of collaborative learning lie in the fields of conflict management, active learning, and systems thinking. These researchers have been involved in multiple efforts to resolve natural resource conflicts associated with public lands based on collaborative learning. This approach “is motivated out of the need to make progress in the face of potentially paralyzing social and technical complexity” (Daniels and Walker 2001, p. xiii). It recognizes that natural resource problems are often based on values and involve complex natural systems. It emphasizes that natural resource management and policy decisions need to be scientifically based, and

that those individuals whose lives will be impacted by the decision need to be included in the process. Due to the complex nature of most natural resource problems and the varying degree of understanding possessed by those affected, the need for technical solutions and meaningful public involvement can be difficult to reconcile. Thus, learning has an important role to play in developing a common understanding of the natural resource problem and of the concerns of all those impacted by them (Daniels and Walker 1996; 2001).

Collaborative learning is an adaptive process that can be tailored to specific situations and therefore has no set format. However, Daniels and Walker (2001) identify several general features of a collaborative learning process (p. 23):

1. Those facilitating the process have an understanding of the natural resource situation from all stakeholder perspectives.
2. A series of public events, including as many stakeholders as possible, are held to facilitate learning by participants about the natural resource issue and about the interests of other stakeholders.
3. An analytic phase in which stakeholder concerns are translated into alternative action plans.
4. Evaluation phase when stakeholders debate the desirability of the proposed alternative action plans.
5. A point at which participants make a decision regarding those issues in which they have the authority to personally do so and/or the group of participants as a whole makes a decision to pursue a particular project collaboratively.
6. The decision(s) and/or project is implemented and evaluated.

The authors emphasize that the goal of a collaborative learning process is to develop a plan of action that will improve the local natural resource situation, not to create solutions to natural resource problems (Daniels and Walker 1996; 2001). “Solving” natural resource problems is nearly impossible, while

improvement to the situation is a goal whose attainment would likely lead to further action by stakeholders.

Thus, collaborative learning is based on the process of citizens gaining a better understanding of the natural resource issues that affect their daily lives and of the views of others regarding these issues and how they should be addressed. Additionally, this learning process should result in a realistic action plan that has been agreed upon by participants. It acknowledges the complexity of natural systems, is not based on anthropocentric or reductionist viewpoints, and empowers local communities to address natural resource problems. Collaborative learning fails to directly address the problems associated with markets, but providing incentives for conservation could be a component of the action plan.

Other researchers and practitioners have described approaches based on similar principles as collaborative learning. For example, Woodhill and Roling (1998) discuss social learning as a process by which stakeholders can engage in discourse and learn to adapt systems to rapid technological and environmental change. Schusler et al. (2003) also discuss a social learning approach to addressing natural resource management issues in New York's Lake Ontario Islands Wildlife Management Area. Additionally, researchers at Manaaki Whenua Landcare Research in New Zealand have utilized collaborative learning and participatory processes to improve the quality of decision-making in environmental management (Manaaki Whenua Landcare Research 2005). Critical environmental assessment education, described by Diduck (1999),

utilizes learning to increase the capacity of local communities to participate in natural resource decision-making. Collaborative planning is also based on the need to involve stakeholders in governance and to incorporate learning into the process of decision-making (Booher and Innes 2002; Innes and Booher 2003). Furthermore, Dukes (1996) suggests the need for a "transformative practice" of public conflict resolution and the development of interest- and/or place-based communities where learning is a key goal.

**Civic Environmentalism**

One of the first researchers to use the term "civic environmentalism" was DeWitt John, in his 1994 book of that title. Subsequent authors have used the term to describe similar ideas, but this discussion will be based on John's conceptualization. John and Mlay (1999) describe civic environmentalism as "an ad hoc process of custom designing answers to complex environmental problems in a specific location" (p.355). It emerged in the 1980s when federal cutbacks for environmental programs compelled some states to look for non-regulatory ways to address natural resource problems.

Leadership for civic environmentalism has generally come from the state and local levels, with approaches based on local circumstances. John (1994) describes five main features of civic environmentalism (p. 260):

1. It focuses on natural resource problems that have not been (and possibly cannot be) effectively addressed by regulations, such as non-point source pollution, pollution prevention, and ecosystem management.
2. It primarily utilizes non-regulatory tools.
3. It involves extensive cooperation between agencies at all levels of government.

4. It seeks alternatives to conflict and confrontation.
5. The role of federal government is to provide a threat of regulation, funding assistance, and information in support of decisions made at the state or local level.

John (1994) emphasizes the roles for states and agencies in addressing natural resource problems. He does not directly discuss the role of citizens in natural resource management. This likely reflects his background in the field of public administration. He notes that states have clear advantages in addressing these problems via civic environmentalism due to their smaller geographies, large number of opportunities for citizens to serve, and increased flexibility to work across agencies.

Civic environmentalism is a broader concept than collaborative learning, which focuses more on the actual process of bringing people together and developing an action plan. John (1994) conceptualizes civic environmentalism as a broader trend toward locally-based, non-regulatory mechanisms to address a natural resource problem rather than a particular process by which to develop such mechanisms. These mechanisms can be viewed as ways to encourage or support civic environmentalism (John and Mlay 1999).

Civic environmentalism recognizes the complexity of natural systems and can incorporate intrinsic values of nature and not just utilitarian values. Additionally, civic environmentalism strives to involve local citizens and communities in addressing natural resource issues of concern. Civic environmentalism begins to address the problem associated with markets via

non-regulatory policies, some of which are market-based and offer incentives for conservation and pollution prevention.

Initiatives that could be classified as examples of civic environmentalism have occurred across the United States. Appleton (1998) describes efforts by New York City to provide conservation incentives to farmers in the upstream watersheds that supply the City's drinking water. Rabe (1999) discusses the efforts to address sustainability problems in the Great Lakes Basin. These efforts have been regional in scale and have worked across jurisdictions and across environmental mediums to pursue sustainability goals. The Massachusetts Watershed Initiative, a statewide program that coordinates the development of watershed councils to address local environmental problems, is another example of civic environmentalism (Michaels 2001).

**Resilience-building Management**

The work of C.S. Holling, Carl Folke, Lance Gunderson, Filkret Berkes, and their colleagues is primarily grounded in ecology and systems theory. They call for a systems-based approach to natural resource problems based on the linkages between social and ecological systems (Berkes and Folke 1998; Holling et al. 2002). Much of their work is designed to address the need for resilience in social-ecological systems, meaning that ecosystems should be able to persist through disturbances without a major shift in the functioning of the system as a whole. Due to past management practices, many social-ecological systems in the

United States have lost much of this resiliency (Folke et al. 2004; Holling and Meffe 1996).

Resilience is related to the idea of adaptive change in systems. Systems must be able to adapt to changes across space and over time. Additionally, management of these systems must be interdisciplinary, incorporating theories from economics, ecology, and the study of institutions. Holling et al. (2002) state, "One way to generate more robust foundations for sustainable decision-making is to search for integrative theories that combine disciplinary strengths while filling disciplinary gaps" (p.8). Building on the insights of individual disciplines, while addressing inconsistencies between disciplines, is necessary for resilience-building management.

Folke et al. (1998) offer the following seven principles for building resilience in social-ecological systems. These principles emphasize the importance of management that is flexible and based on systems thinking, as well as local conditions (quoted from p. 429-431):

1. Using management practices based on local ecological knowledge
2. Designing management systems that 'flow with nature'
3. Developing local ecological knowledge for understanding cycles of natural and unpredictable events
4. Enhancing social mechanisms for building resilience
5. Promoting conditions for self-organization and institutional learning
6. Re-discovering adaptive management
7. Developing values consistent with resilient and sustainable social-ecological systems

The last of these principles is important to note. Resilience and the long-term sustainability of social-ecological systems require humans to value these as

goals. It cannot be assumed that all communities value these goals. It may be necessary to nurture the development of these values.

Management for resilience requires those responsible for management to be adaptable so that they can change practices to adjust for unexpected outcomes and changes in the ecosystem. This type of management process must also "be flexible and open to learning" (Folke et al. 2004, p. 575). The process should also involve local communities and integrate local understanding into management decisions. An important goal of resilience-building management is to enhance not just the capacity of local ecosystems, but also of local residents, to change from a less desired to a more desired state (Folke et al. 2004). Resilience-building management can address market insufficiencies by shifting values associated with conservation and by establishing "social mechanisms" to offer incentives for conservation.

Adaptive management, co-management, and soft systems methodology (SSM) are also based on a systems approach to natural resource management. Adaptive management relies upon monitoring to determine the effectiveness of management practices and to guide potential changes in management. First described by Holling (1978), it has recently been used in watershed councils (Habron 2003) and forest planning in the Pacific Northwest (Stankey et al. 2003), as well as forest management in Mexico (Klooster 2002).

Though definitions vary, co-management is generally referred to as management in which a partnership is established between local communities and natural resource agencies for decision-making (Castro and Nielsen 2001). It

has been used in Canada and South Asia (Castro and Nielsen 2001) and fisheries management in New Zealand (Yandle 2003) and has been proposed as a means to balance water supplies for both human and ecosystem uses (Wallace et al. 2003).

Soft systems methodology (SSM), as described by Checkland and Scholes (1999), developed out of systems engineering as a way to better understand complexities associated with human behavior that could not be explained by "hard" systems theories. SSM has recently been applied to regional resource planning in Queensland, Australia (Zhu and Dale 2000), watershed planning in Michigan (Habron et al. 2004), and forest management in Indonesia (Purnomo et al. 2004).

**Collective Action**

Theories of collective action have their roots in the study of common pool resources. While Hardin's (1968) "tragedy of the commons" was once thought unavoidable, studies over the past several decades have found that user groups have devised institutional arrangements that have successfully managed common pool resources and have endured over time. Elinor Ostrom and her colleagues at the Workshop in Political Theory and Policy Analysis at Indiana University have been leaders in the study of these institutions. The actual institutional arrangements vary from case to case, depending on the resource and the characteristics of the local users (Stern et al. 2002).

Studies have examined the characteristics of the users and of the resources in instances where users have developed institutional arrangements for governing common pool resources. Ostrom (1999) offers a list of attributes for the development of institutions that have consistently been noted in instances of collective action. These attributes are listed and described in Figure 1.

Many of the common pool resource issues that have been studied are managed under common property systems. However, common pool resource issues can also exist in privately owned landscapes. For instance, many water supply and quality problems can be categorized as common pool resource issues (Alyward and Gonzalez 1998). An assessment of these local natural resource problems according to the attributes in Figure 1 reveals which attributes are absent or lacking. Potential changes to rules, as well as ways in which agencies and non-governmental organizations can assist local citizens in addressing their needs, can then be identified.

Empowering local communities is at the heart of collective action theories. In doing so, local knowledge of the resource system is integrated into management decisions. This knowledge is often more systems-based and holistic than the information driving conventional approaches to natural resource management. Collective action can address problems associated with a lack of market incentives for conservation through the development of mechanisms by which landowners are compensated for the public benefits they provide.

**Attributes of the Resource**

1. *Feasible improvement*. The resource is not degraded to the extent that it is futile to try to address problems AND the resource is not under so little stress that addressing problems will be of little value.
2. *Indicators.* Information about the condition of the resource is available to users and is also accurate and affordable to obtain.
3. *Predictability*. The availability of resource units must be predictable.
4. *Spatial extent*. The resource must be small enough that it is feasible for users to obtain accurate knowledge of the boundaries and the processes impacting the resource.

**Attributes of the Users**

5. *Salience*. The problem must be relevant to the users. It must negatively impact their livelihood or other values they place on the resource (i.e. recreational uses).
6. *Common understanding*. Users need to be in agreement about the status of the resource and the effects of their decisions on other users and on the resource.
7. *Discount rate*. Users must have a sufficiently low discount rate in relation to future benefits to be achieved from the resource.
8. *Distribution of interests*. Those users with greater levels of financial wealth and political influence are also, or could be, negatively affected by resource problems.
9. *Trust*. Relationships among users must be strong enough that at least a minimal level of trust and commonality exists. They must feel confident that other users will keep their word and adhere to agreements.
10. *Autonomy*. Users must have the legal authority to establish self-governing mechanisms.
11. *Prior organizational experience*. Users must have some experience with self-organization or have a means to develop the skills needed to effectively organize to address an issue within their community.

**Figure 1. Key Attributes Found in Successful Collective Action (from Ostrom 1999)**

Resource user groups have organized to collectively address local natural resource management problems. Worldwide, Pretty (2003) estimates that about 500,000 local groups have formed since the early 1990s to address natural resource problems ranging from watershed management to forest management to integrated pest management.

**Interactional Community Development**

Rural sociology offers many approaches to community development, one of which is the interactional approach. This approach, described by Kaufman (1959) and Wilkinson (1970), equates community to "a dynamic field rather than a system" (Wilkinson 1999: 32). This community field is used "to denote the network of social interactions that contains and integrates various community interests in a local society" (Wilkinson 1999: 81). On one hand, the community field can be thought of as one of several social fields of action in a community; others might include economic development, health care, and recreation. Yet at the same time, the community field cuts across all the other social fields and unites them as a whole (Wilkinson 1999). The community field is focused on all aspects of the well-being of the entire community, rather than a single interest or social group. The community field influences and is influenced by all the other social fields in a locality.

From an interactional perspective, community development can be considered "a process of developing the community field" (Wilkinson 1999: 81). Specifically, this process must be "purposive" in striving to unify the various social

fields in the community. Wilkinson  attests that the value of community development lies in “the efforts of people and not necessarily in goal achievement” (p. 87). Interactional community development has a distinct emphasis on the nurturing of relationships among community members. Strong local relationships are essential to any effort to address local natural resource problems. The capacity developed via interactional community development can be channeled to these problems within the community.

Interactional community development empowers local citizens and utilizes their understandings of local conditions. It is based upon whatever values participants associate with natural resources, not just anthropocentric ones. Interactional community development often involves a focus on economic development. Many rural communities are beginning to place higher value on non-commodity uses of natural resources, and interactional community development could focus on finding ways to offer incentives for these uses, thus addressing problems associated with market inadequacies.

## Common Threads

While each of these approaches is distinctive in its origins and processes, there are some common themes across all of them. First, the approaches all advocate moving away from expert models of management and toward *participatory decision-making processes*, in which citizens have an active role as participants in the governance of local natural resources. In collaborative learning, facilitators try to involve as many stakeholders as possilbe, and they are

encouraged to acknowledge the value in the perspectives and interests of others. Civic environmentalism purposefully seeks alternatives to conflicts and shifts authority to state and local levels of government. Collective action and interactional community development are both grounded in the cooperative relationships between local citizens, and resilience-building management strives to integrate local knowledge and values into management regimes.

Next, the approaches all involve *new roles for agencies* in the governing of natural resources. In collaborative learning, agencies are encouraged to initiate the learning process and provide incentives for participation. In civic environmentalism, federal agencies carry the “big stick” of regulation but also offer financial and technical assistance, while state agencies are encouraged to try non-regulatory approaches to environmental and natural resource policy. In collective action and interactional community development, agencies can play an important role in facilitating processes that build relationships within local communities. In resilience-building management, agencies must encourage self-organization and promote adaptive management.

Finally, each of these innovative approaches is *flexible and adaptable* to local situations. Collaborative learning processes can be tailored to the situation at hand and actions can be evaluated and adapted based on their results. Civic environmentalism primarily focuses on the state level of governance, providing the ability to adapt to conditions within the state. Collective action and interactional community development are locally-driven processes based on the understanding and needs of the local community, making them very adaptable

and responsive to change. Adaptive management is at the core of resilience-building management, as is the need to base management on local ecological knowledge.

These common threads that run across these five processes provide a broad picture of the many types of processes that are emerging as alternatives to conventional natural resource management. These characteristics are likely present in other processes that were not discussed. It is hoped that natural resource management and policy grounded in these principles will better address today's natural resource problems by overcoming the shortfalls described.

## Potential Application of these Innovative Approaches to Natural Resource Management on Private Lands

Activities on privately owned lands in the United States contribute significantly to many environmental and natural resource problems, such as the pollution of both surface and groundwater, for which landowners are not held accountable (Shutkin 2000). These lands also provide many benefits to society for which landowners are not compensated. Currently, few mechanisms exist by which landowners are offered incentives to actively manage land for environmental benefits or to work collaboratively across ownerships to manage at a landscape scale (Wolff and Hirschhorn 2001). In fact, Bean et al. (2003) state, "Engaging the nation's private landowners is the most important challenge facing conservation today" (p. 1). The approaches described in the previous section offer means by which to meet this challenge.

These new approaches to natural resource policy have recently been applied to natural resource problems on private lands. Agencies at the state and federal level have initiated processes to help communities address local conservation priorities while contributing to the overall health of the community and the environment. The financial and technical support of these agencies is invaluable, especially in rural communities that lack the resources necessary to pursue such initiatives independently (Rosa et al. 2003; Wolff and Hirschhorn 2001). Many of these initiatives have successfully engaged landowners and resulted in the implementation of conservation practices (Bean et al. 2003).

The increasingly complicated patterns of ownership, coupled with the trend toward increased parcelization (division of large parcels of land into several smaller ones), make it difficult for landowners to consider landscape- or ecosystem-level impacts of their own management strategies (Cooperative Development Services 2002). Participatory processes in which learning is emphasized provide the opportunity for landowners to learn from one another and to better understand the impacts of management decisions at larger spatial and temporal scales.

Processes like those described could result in the development of more effective conservation incentives for private landowners to manage for environmental benefits. The “suite” of incentives could potentially include direct payments, tax incentives, and subsidies (Rosa et al. 2003). Additionally, the processes could result in the establishment of cooperative management agreements between landowners across a given landscape.

When applied to private lands, these processes should involve multiple stakeholders, build organizational capacity in local communities, and address local priorities, as suggested by the approaches described above. In addition, property rights should be protected.

## Conclusions

The natural resource problems that we are now facing are very complex and have not been effectively addressed by policies. The challenges presented by these problems require new approaches to the governance of natural resources in the United States. These approaches must recognize that the governance of natural resources is not only a technical task, but a social process. The values of local residents regarding present and future management of natural resources should be assessed and incorporated into governance regimes.

Researchers from many different disciplines, including political science, sociology, and public administration, have described processes that overcome many of the failings of conventional natural resource policy. These processes encourage the participation of citizens in decision-making, require state and federal agencies to assume non-regulatory roles, and are flexible and adaptable to change and local circumstances. They have been applied in many different regions of the United States and the world in recent years. While long-term impacts are not yet apparent, these approaches appear to offer the opportunity to more effectively address complex problems.

The management of natural resources on private lands presents a unique set of problems and a unique set of opportunities to provide environmental benefits. However, without adequate incentives, landowners are unlikely to manage their land to provide important ecosystem services. Participatory processes such as those described in this paper have the potential to result in the development of more effective incentives for conservation on private lands and to encourage ecosystem management across ownership boundaries.

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# PART 3: BUILDING CAPACITY FOR LOCAL GOVERNANCE: AN APPLICATION OF THE INTERACTIONAL THEORY TO THE DEVELOPMENT OF A COMMUNITY OF INTEREST

This part is a significantly revised version of a paper entitled “Using a Community of Interest to Revitalize a Community of Place in Morgan County, Tennessee: An Interactional Approach to Community Development” presented at the 66th Annual Meeting of the Rural Sociological Society in Montreal, Quebec, in 2003 by Jamey L. Pavey, Allyson B. Muth, Miriam L.E. Steiner Davis, and David Ostermeier.

My primary contributions to this paper include: (1) developing the original idea and plan for the paper, (2) collecting data in half of the key informant interviews, (3) conducting and analyzing all focus group interviews, (4) participating and/or taking notes during many meetings of the Deer Lodge Community Group, (5) pulling the various contributions into a single paper, and (6) most of the writing.


**Abstract**

The Emory-Obed Watershed in Tennessee, like many other rural areas throughout the US, is experiencing changes in economic activities and social values associated with natural resources. Researchers utilized key informant and focus group interviews to gain information about the watershed and to obtain different perspectives on resource-related issues. Data from key informant interviews led to the selection of a geographic community in which a community of interest was nurtured. The effort was informed by the interactional approach to community development and strove to build the capacity of the community to take advantage of potential opportunities for local governance. It was found that gaining entry into the community and building trust between participants and between participants and researchers were key factors in this community development effort. Lessons learned that could be applied to similar efforts are also discussed.

## Introduction

Part 2 of this dissertation provided an introduction to some of the problems with natural resource governance and discussed processes that have been developed to deal with those problems. This part is a case study of a community development effort that was initiated in a rural community facing many of the challenges that are found throughout rural America. Specifically, two problems described in Part 2 are present: 1) the limited capacity of the community to address local natural resource issues and 2) a lack of adequate incentives for the conservation of natural resources on private lands. Interactional community development, one of the processes described in Part 2, was utilized in an effort to help the Deer Lodge, TN, community be proactive about social change.

Rural communities face many challenges to their traditional social and economic systems at the beginning of the 21st Century. Among the most prominent challenges are encroaching residential development, loss of traditional employment, and an absence of social capital (Flora et al. 1992). The recent emphasis on the devolution of authority from the federal and state level to the regional or local level offers communities the opportunity to plan for their futures by tailoring regulations to fit local circumstances. Additionally, civil society, which includes those organizations not affiliated with government and not profit driven, has emerged as a powerful force influencing development and regulation (Daniels and Walker 2001; Innes and Booher 2003; Karkkainen et al. 2000; World Resources Institute 2003).

Unfortunately, many rural communities lack the financial and social capacity to effectively take advantage of the opportunities associated with devolution. The potential of civil society and local government to assist these communities in making the most of opportunities for local governance is great, but measures must be taken to ensure that the desires and needs of local residents are respected.

Communities of interest, a facet of civil society, are embedded within a larger community and develop as a result of common concerns about an issue or resource (Flora and Flora 1995). Communities of interest can also stem from common interests, goals, or attitudes that are present within the community of place. Though conflict can result when the goals of a community of interest do not fully reflect those of residents of the geographic community, the potential exists to unite the resources and energy of the two levels of community to collaboratively plan for the future.

Murray and Dunn note that outside facilitators can play an important role in bridging the gap between a community of interest and the larger community. They write, "[Facilitators'] mission should be to reinforce learning by doing, for example, by assisting rural communities with the formation of a common vision, developing community audit skills, demonstrating the importance of setting and prioritizing realistic objectives consistent with local values, facilitating a strategic plan and phased operational measures, and encouraging the monitoring and evaluation of progress" (Murray and Dunn 1996: 22-23). These efforts can serve to build social capacity for addressing change and for establishing mechanisms

of governance in the larger community through the efforts of a community of interest.

Researchers involved in efforts described in this paper sought to initiate a community development effort in the Emory-Obed Watershed in Tennessee. Due to researcher interests and the area's strong socio-economic and cultural ties to natural resources, these efforts were initiated with a focus on the forests and other natural resources of the area. This paper describes the data collection methods employed, the results obtained, and the application of the results to the formation of the Deer Lodge Community Group.

## The Interactional Approach to Community and Community Development

Rural sociology offers many approaches to community development. The interactional approach, described by Kaufman (1959) and Wilkinson (1970), equates community to "a dynamic field rather than a system" (Wilkinson 1999: 32). This community field is used "to denote the network of social interactions that contains and integrates various community interests in a local society" (Wilkinson 1999: 81). On one hand, the community field can be thought of as one of several social fields of action in a community; others might include economic development, health care, and recreation. Yet at the same time, the community field cuts across all the other social fields and unites them as a whole (Wilkinson 1999). The community field is focused on all aspects of the well-being of the entire community, rather than a single interest or social group. The community field influences and is influenced by all the other social fields in a locality.

Communities of interest can be thought of as “representing” a single social field within a community of place, while within the community of place there also exists a community field which is focused on the well-being of the community as a whole.

From an interactional perspective, community development can be considered “a process of developing the community field” (Wilkinson 1999: 81). Specifically, this process must be “purposive” in striving to unify the various social fields in the community. Wilkinson attests that the value of community development lies in “the efforts of people and not necessarily in goal achievement” (P. 87). The interactional theory’s focus on relationships was a driving force behind this community development effort. Through the development of a community of interest based on natural resources, it was hoped that relationships between participants would be strengthened and that social capacity for addressing change would be developed. Thus the development of a community of interest can be seen as a first step in the development of a community field and as a means to help rural communities take advantage of opportunities for local governance.

## Methods

Background information about both the community of interest related to natural resources and the communities of place in the watershed was needed to familiarize the researchers with the area and to gain entry into a specific community in which to work. The selection of methods by which to obtain this

background information in the Emory-Obed Watershed was driven by the desire of researchers to gain a full understanding of the natural resource-related values, interests, and visions of landowners, residents, and stakeholders in the watershed, so that community development efforts could be based on those issues that were truly of concern to stakeholders and local residents. Additionally, researchers wanted the opportunity to inform community leaders of the community development efforts. Therefore, a two-phase data collection effort was used. First, key informant interviews were employed across the entire watershed. Second, focus group interviews were utilized within the community of place chosen. This section first describes the Emory-Obed Watershed, then each of the data collection methods used, and finally the community of place chosen for further efforts.

**Emory-Obed Watershed**

The Emory-Obed Watershed encompasses most of Morgan and Cumberland Counties in north central Tennessee (see Figure 2). The area is extensively forested, primarily in upland hardwood but with pine plantations occurring throughout the region. Most of the land is held by private landowners but there are several public holdings including a National Wild and Scenic River, a state park, two state forests, a state-managed Wildlife Management Area, and several correctional facilities. The watershed is comprised of eastern portions of the Cumberland Plateau and the western edges of the Cumberland Mountains.

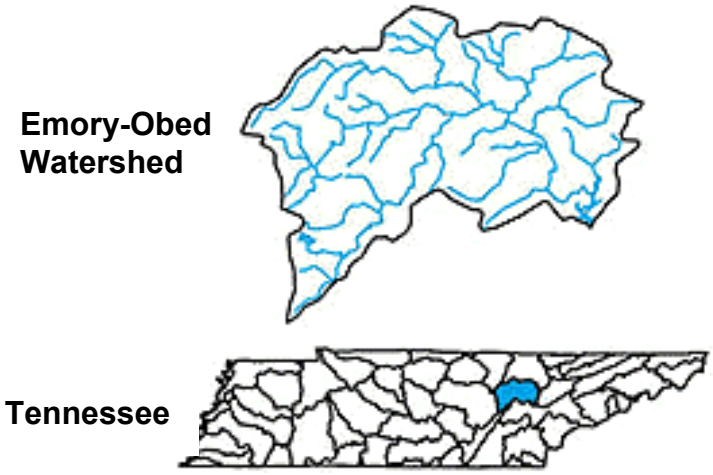


**Figure 2. Map of the Emory-Obed Watershed. Source: TN Department of Environment and Conservation (1998a)**

The Obed River is a tributary of the Emory River, which flows east into the Clinch River and drains into the Tennessee River.

Cumberland County is experiencing significant development pressure. According to the 2000 Census, it was the fastest growing non-metropolitan county in Tennessee. This growth is primarily within retirement communities (Associated Press 2001). Morgan County has yet to experience the same degree of development pressure, but it has begun to see an increase in individuals building retirement or second homes in rural areas. These individuals are likely attracted by the area's scenic quality and abundant natural resources.

### Key Informant Interviews

Key informant interviews were employed to gain a better understanding of issues related to forestry and land use, as well as how community members relate to these issues and to each other. In addition, information regarding how

these issues affected specific communities in the watershed was obtained. This information was then used to identify a specific community of place in which further activities would be pursued.

In the summer of 2002, eighteen key informants (13 males and 5 females) were identified in the Emory-Obed Watershed. A snowball sampling method was used, starting with regional natural resource professionals and other prominent stakeholders. These individuals identified others familiar with the natural resources and communities in the study area. The final pool of key informants represented the following community segments: state natural resource agencies, local government, the forest products industry, non-profit social services organizations, environmental non-profit organizations, federal agencies, the University of Tennessee, the Chamber of Commerce, and landowners.

Semi-structured, face-to-face interviews were used in order to answer basic questions and to ensure the same information was gathered from all informants. Key informants were asked to address questions relating to forests, natural resources, and communities in the watershed including questions concerning land use trends, significant actions involving private forest land management, socio-economic or cultural differences between people and/or communities, trust, and hopes, visions, and fears related to forests and natural resources. In addition, key informants were asked to identify particular communities that might stand out as being well connected to the area's forests. The results of the interviews were summarized, and common themes were identified. As mentioned previously, these results were used to select the

community of place, Deer Lodge in Morgan County, in which all further efforts would be concentrated. The criteria used to select this community are described in more detail in later sections.

**Focus Group Interviews**

Following the selection of Deer Lodge as the community of place, focus groups were conducted with community residents, natural resource professionals, and other stakeholders with an interest in the area's natural resources. These groups were structured to provide more detailed information about the forest-related concerns, challenges, and hopes of participants. Questions were informed by the results of the key informant interviews and sought to obtain the information needed to initiate a community of interest.

Five focus groups were conducted between August 2002 and January 2003; one with each of the following types of participants:

- Natural resource professionals with responsibilities in Morgan County, including Deer Lodge;
- "Conservation" stakeholders who were members of environmental, recreational, or conservation groups active in Deer Lodge and/or Morgan County;
- "Utilitarian" stakeholders represented by loggers, sawmill operators, Farm Bureau, timber industry, etc., active in Deer Lodge and/or Morgan County;
- Landowners in the Deer Lodge area who responded in a phone survey that they had or planned to have a timber sale (hereafter referred to as "timber landowners"), and
- Landowners in the Deer Lodge area who responded in a phone survey that they had not had and did not plan to have a timber sale (hereafter referred to as "non timber landowners").

The participants in each focus group were selected based on the characteristics mentioned above to achieve relative homogeneity within each group. Group size ranged from five to nine participants (Morgan 1998). Each session lasted approximately two hours and was tape-recorded for review. Detailed notes were also taken by a member of the research team.

Each group was asked to comment on four key topics. The questions were adapted as needed to apply to each group. Areas of inquiry were as follows:

- Forest-related concerns and how they differ between the types of participants
- Challenges faced in influencing or making land management decisions
- Hopes about the future of the forests in the area and how these hopes differ between the types of participants
- Ideas about how to ensure that hopes are realized and applied in local communities

Primary analysis was conducted based on the notes taken during each session. Audio tapes were used for clarification and to capture supporting statements. Responses to each question were summarized and categorized, with quotes provided for clarification and support.

**Deer Lodge, TN**

The unincorporated town of Deer Lodge lies in northwestern Morgan County. At the time of European settlement, the area was heavily forested (Dickinson 1987) and continues to be so today, though the composition of the forest has changed due to past logging practices. A sawmill opened in the Deer Lodge area in the early 1800s and operated until 1900. The town flourished for

several years, but an exodus began with the loss of the mill (Freytag and Ott 1971). The town never fully recovered from this loss. In addition, the local elementary school closed in the 1980s, serving to further weaken residents' connection to the community.

Most employed residents work outside the town, and often outside the county. Occupations in Morgan County fall heavily in production and transportation industries. According to the 2000 Census, 27% of employed county residents work in these fields. While the 1960 Census indicated that nearly 20% of county residents were employed in the fields of forestry, farming, fisheries, or mining, fewer than 5% are now employed in these industries (U.S. Census Bureau 1960; 2000). This low percentage can be attributed to a number of factors, including the following: logging the area's high-graded hardwood remnants is not profitable, a lack of markets for the timber products that can be extracted, the decline of the tobacco industry, and the general difficulties in supporting a full-time family farm. Morgan County is an area of high poverty, lagging behind state averages for family, household and per capita income (U.S. Census Bureau 2000).

A growing number of Deer Lodge residents are retired persons who have made their income elsewhere and have come to the area to enjoy its natural and scenic beauty. This development pressure is changing the structure of the county with the creation of a new middle class whose values were formed elsewhere. This has caused some conflict with longer-term residents who have made their living through resource-extractive activities such as mining, timber harvesting,

and oil drilling, especially as many newcomers are more conservation oriented. A challenge, therefore, lay in helping community members, both new and lifelong, to be proactive about change.

## Results

### Key Informant Interviews

The key informant interviews provided an overall history of factors influencing land ownership patterns and land use in the watershed, as well as an overview of current issues and concerns. Historical influences include early settlement programs granting land to individuals and land-holding companies, land forfeitures resulting from the Great Depression, and the existence of many public land holdings in the area. Participants noted that extractive industries, such as commercial logging and mining, dominated the economy of the area for many years, especially in Morgan County. Activity in both industries, but especially in mining, has declined over the past several decades.

Key informants identified several current forestry-related issues. Specifically, they were concerned about recent changes in the operations of timber companies and about private landowners' ability to practice economically viable forest management on their land. Participants also noted that new political influences exerted by the increasing influx of outsiders settling in the area were causing traditionally resource dependent communities to experience uncertainty related to forest stewardship. Additionally, key informants noted widespread

concern about the effects of a recent Southern pine beetle (*Dendroctons frontalis* Zimmermann) outbreak.

Key informants generally felt that private forest landowners in the area were unaware of the assistance available to them and that landowners questioned whether they were doing what is best for their land. Key informants noted that participation in forest landowner associations was not extensive and that they tended to see the same faces at educational workshops. The key informants felt that landowners were generally not involved in activities related to the management of their land and that there was a great deal of land not under management (as defined by the key informants).

Social and cultural distinctions between watershed residents were readily identified. These included differences in wealth, education level, length of residency, rivalries between different communities, and social status. The general feeling was that social group distinctions did not significantly inhibit interactions among different social groups, which were based primarily around organized activities such as church, work, and school.

Key informants described trust in the Emory-Obed Watershed as complicated. The majority of key informants mentioned some level of distrust by local residents towards the government. This varied from distrust of all government in all forms all the time, to distrust for certain levels of government based on various community residents' individual and collective experiences. Several key informants noted that trust within communities and within social

groups, especially within one's own community or social group, was greater than trust between communities or social groups.

It was generally felt that communities were either unwilling to collectively address the forest-related issues identified or unable to do so because the necessary financial, social, and human capital was lacking. Reasons for these conclusions included: people not knowing what to do, residents taking the natural resources and environment for granted, lack of a long-term vision, resistance to regulations, and varying levels of interest regarding these issues among communities and individuals. This finding indicates that communities in the area were lacking a community field.

Key informants generally felt that the willingness of landowners to work together to manage natural resources was dependent upon the incentives associated with such a cooperative relationship. It was noted that people might be more willing to work together if they were given some direction first.

No agreement on visions and hopes emerged. Those expressed were: 1) development of recreational and tourism opportunities, which included maintaining scenic beauty and preservation/conservation of natural resources; 2) growth in forest industry, based on utilization of the land for logging and timber production; and 3) growth in manufacturing and residential development.

Reported fears concerning the future of the watershed and its forests were diverse, complex, and multi-dimensional. One key informant summed it up well by stating that the fears of some seem to be the vision of others. It was noted that, compared to those living in larger towns, residents of more remote, rural

areas feared outsiders more, experienced a greater distrust of government, and expressed more resentment towards the amount of public land in the area. No particular community stood out as being well connected to the area's forests, with seventeen different communities being mentioned by key informants as having a connection.

Despite the fact that no single community stood out as being well connected to the area's forests, the information obtained via the key informant interviews was valuable in our effort to select a community of place in which to foster a community of interest. Specifically, we wanted to select a community that possessed a history of connection to the forestland in the county and a history of past cooperative efforts within the community. Ideally, the community would have at least attempted a community action, have built up community agency, and therefore may show increased willingness for future efforts (Luloff and Swanson 1995; Wilkinson 1999). Residents of Deer Lodge and the surrounding area were identified by multiple key informants as being tied to the forests and as having relatively high levels of community pride. These characteristics led researchers to select Deer Lodge as the community of place in which to concentrate further efforts.

**Focus Group Interviews**

Several major themes were identified from the focus groups. Themes that emerged in at least two groups are summarized in Table 1. These and other major themes are described in more detail below.

## Table 1. Primary Themes Identified in Focus Groups

| | Participant Type / Theme | Natural Resource Professionals | Conservation Stakeholders | Utilitarian Stakeholders | Timber Landowners | Non-timber Landowners |
|---|---|---|---|---|---|---|
| Concerns | Concern about low quality timber and highgrading practices | Present | Present | Present | Present | |
| | Concern about encroaching development | | Present | Present | | Present |
| | Concern about Southern Pine Beetle damage | | | Present | Present | Present |
| | Concern about conversion of native hardwoods to pine | | Present | | | Present |
| Challenge | Amount of time and effort required to properly manage | | | | Present | Present |
| Hopes | Hope for or fear of regulations | | Present | Present | Present | |
| | Hope for more land under scientific management | Present | | Present | | |
| Ideas to achieve hopes | Simplify and improve government cost share programs | Present | Present | Present | Present | Present |
| | More landowner education efforts and demonstration projects | Present | Present | Present | Present | |

Four major forest-related concerns surfaced during the focus groups. First, participants in each group, except the non-timber landowners, expressed concern about the low quality of timber in the area and the highgrading practices used by loggers. Second, both stakeholder groups and the non-timber landowners indicated concern regarding encroaching development activity. A conservation stakeholder noted:

> *"I'm concerned about what happens once you cut all the trees down. I don't want to see development come in more strongly in that area. I think when you clear cut, the forest will grow back eventually and if you plant the right kind of trees, you get a good forest…but my concern is that once those trees are gone, developers are going to come in and start building houses on those areas."*

Third, damage related to the outbreak of the Southern pine beetle was a concern of utilitarian stakeholders and both sets of landowners. Finally, conversion of hardwood forests into pine plantations was a concern of the conservation stakeholders and the non-timber landowners.

Challenges discussed by participants were dependent upon the nature of their relationship to the forestland and thus varied from group to group. Therefore, these themes did not tend to surface in multiple groups. Natural resource professionals discussed difficulties related to "selling" forest management to landowners. The conservation stakeholders mentioned several challenges related to the area's persistent poverty and the widespread negative image of environmentalists. One participant noted:

> *"When I look at the challenges that are there…systemic poverty, historic ignorance. Wrap that up with current propaganda on a number of fronts all the way around, and you've got a population that's largely incapable of sorting truth from fiction and making judgments…"*

The utilitarian stakeholders saw potential regulation of forest harvest practices and a lack of markets for low quality and cull wood as major challenges. Both sets of landowners saw the primary challenge to forest management as the investment of time and energy required to properly manage forestland. Additionally, the timber landowners were fearful of the potential regulation of forestry practices.

Many hopes were expressed in the focus groups. One overarching hope that was alluded to, if not explicitly expressed, in all five groups was for a future that includes the existence of healthy, profitable forests in Morgan County. Most of the other hopes were related to various ways in which this might be achieved. For example, natural resource professionals hoped to boost the amount of acreage being scientifically managed by working with landowners to help them gain a better understanding of sustainable forestry. Conservation stakeholders focused on the implementation of sustainable forestry practices and the development of markets for forest products that would contribute to the local economy. The hopes of the conservation stakeholder participants focused more on ensuring the long-term viability of both the human community and the biological community than other groups. The hopes of the utilitarian stakeholders focused on education and incentives rather than regulation and can be summed up in the following quote:

> *"That there will be a healthy, vibrant, and improving forest constantly being enhanced by education and incentives, not regulation and penalties."*

Timber landowners exhibited a strong stewardship ethic throughout the discussion, expressing the hope that landowners would set an example of good forest stewardship in an effort to maintain healthy forests for future generations. Timber landowners also hoped for favorable returns on their financial and labor investments.

The non-timber landowners were strongly focused on wildlife, with hopes that poaching and trespassing would decrease, and that native wildlife species would be reintroduced on a larger scale. They also hoped that native timber species would be allowed to flourish.

Participants had several ideas for programs or incentives that might encourage private landowners to engage in practices that would lead to the realization of the described hopes. Simplifying and making improvements to cost share programs were noted in all five groups. The development of more landowner education programs and demonstration projects was mentioned in every group except the non-timber landowners. The conservation stakeholder group was the only one to mention regulations as a potential means of achieving sustainable forest management.

The focus groups provided rich information about the topics discussed. The information obtained expanded our understanding of resource issues of concern to the Deer Lodge community and helped us as facilitators and researchers look for ways in which we could help the community move forward in the changing world. While no single concern was present in all groups, the common hope for healthy and profitable forests in Morgan County suggested a

topic around which a community of interest might be developed. In addition, based on the opinions offered in the focus groups, potential areas of agreement and conflict between residents and other stakeholders were identified.

## Discussion

### Application of Results to Community Development: Formation of the Deer Lodge Community Group

Interactional community development theory was used to guide this community development effort. This theory seeks to promote economic development, strengthen horizontal linkages within the community, identify and reinforce community values, and work within existing and develop new relationships between community members (Wilkinson 1970; 1999). The key informant and focus group interviews identified the various social fields that were present in the community. The area's connection to natural resources was utilized as a means of generating interest among community members; however, many of the social fields in the community were discussed and the options unifying them and developing a community field were explored. The researchers, as outsiders, took the approach described by Murray and Dunn  and served as facilitators of this process. The goal was to help Deer Lodge residents identify and address their needs.

The key informant interviews and the focus groups predicted reluctance toward cooperation among community members, the absence of social capital within the community, multiple visions and directions for the future of Deer

Lodge, apathy, and general distrust. This information enabled the researchers to prepare for and attempt to address these potential stumbling blocks to community development. The results of the interviews and focus groups also indicated a need for transparency in all actions, open and inclusive language in newsletters and information shared within the community, and a fairly structured process to create the basis for learning and acting together.

Following completion of the focus groups in January 2003, all private forest landowners and those natural resource professionals and stakeholders with concerns in the Deer Lodge area were invited to participate in an educational and action opportunity addressing forestry and natural resource issues in the community. Due to the area's previously described relationship to natural resources, researchers utilized interest in these resources as a starting point for community development efforts.

At the first meeting, a framework was presented in which participants could freely question one another, share their own experiences and knowledge, learn more about and address issues, express concerns, and make personal sense of information shared with them through interactions with each other and with experts (Muth 2004). The results of the key informant and focus group interviews were used to identify potential directions for the researchers' efforts. However, similar questions were also asked of the newly formed group ("The Deer Lodge Community Group") in order to identify common ground within this particular set of people.

Arising out of the group's discussion were some forestry and natural resource issues, but the group's concerns quickly grew much broader than just natural resources. Group concerns covered county infrastructure, education, sprawl, development pressures, economic development, welfare, and taxation. Given the diversity of interests and the previously expressed desire to work from the concerns of participants, the researchers felt the focus of the group should not be solely on natural resources, as initially planned, but on priorities identified by group members.

The group agreed to meet on a monthly basis and to look for ways in which it could proactively and effectively address community change. Group members expressed optimism at the process and the ability to make decisions for their community, rather than having people make the decisions for them. A couple of months into the effort, the group adopted the slogan "Local People for Local Change," reflecting the desire to direct their own future.

Subsequent meetings involved continued discussions on broader community concerns in order to reach a common understanding about the nature of issues and to determine where energies could most effectively be directed. The group invited representatives from other organizations working within the county to share their objectives and activities in order to seek out areas in which the groups could dovetail or complement each other's efforts.

To ensure the group's concerns reflected those of the larger community, participants developed and undertook a community inquiry research project. A semi-structured questionnaire was developed to ascertain the opinions of

members of the larger community who had been unable or unwilling to participate in the community group. The questionnaire addressed likes and dislikes about the Deer Lodge community and concerns for the future, as well as asking where the group's efforts should be directed. It also informed community members of Deer Lodge Community Group activities and assessed their willingness to take part. The collected information was used to focus the direction of the group's activities and to identify some workable projects and goals.

As a result of the collective inquiry and a desire for action, the group developed a proposal and applied for a grant to investigate and develop a market niche around sustainable agriculture and/or sustainable natural resource activities. While waiting to hear about the grant's approval, The Deer Lodge Community Group proceeded as outlined in the grant proposal to investigate possible marketable products that would promote local economic development utilizing the area's rich natural resources. Entrepreneurs from Morgan County were invited to join the group and share their experiences with small business start-up and development of marketable products. The Deer Lodge Community Group perceived the grant as a potential way to bring in some small cottage industries that would enhance the community's economic position.

Unfortunately, in November 2003, the group received word that the grant application had not been approved and, during the latter part of 2003, the group experienced a substantial decline in participation. It became apparent that the group was in a state of degeneration and perhaps should come to an end. It became too much to ask of the regular participants to continue attending and

working towards their community's future without the support of the larger community. The group decided that it would cease as a functioning unit and that members would try to stay in touch and support each other in other forums. The group ceased meeting in late January 2004.

The Deer Lodge Community Group was the final phase of the researchers' community development efforts. The researchers' goal as facilitators of this group was to foster the creation and development of community capacity in their attempts to proactively address change. Despite the ultimate deterioration of the group, participants in the group indicated they had gained new ways of perceiving their community, formed new connections to other community members and outside experts, and identified opportunities for action as the community moves forward into the future (Muth 2004). This provides evidence that the process was successful in the development of relationships between participants, which is one of the primary goals of interactional community development.

## Summary and Concluding Thoughts

Efforts to develop a community of interest within Deer Lodge were informed by the principles of the interactional theory of community development (Wilkinson 1970; 1999). The theory's focus on relationships between community members and the desire of researchers to better understand those issues of concern to local communities led to the use of key informant and focus group interviews as initial data collection methods. These methods provided the desired

information and served as an effective way to introduce the community development effort to members of the community. Researchers utilized the information gathered to initiate a process of developing a community of interest in a community of place via formation of the Deer Lodge Community Group in Deer Lodge, Tennessee.

Several important lessons applicable to similar efforts were learned from this process. These lessons could be applied to collaborative planning initiatives and other efforts to build a community's capacity to develop local governance mechanisms. First, *it is crucial to work from the values and interests of the local community*. Key informant interviews and focus groups provided such information; however, these were mainly utilized as data collection methods and did not result in the formation of partnerships that would promote the development of a community field.

Second, *it is vital to identify one or more "gatekeepers" within the community* who can help gain access to local residents who value their privacy and have a history of distrust for outsiders. Gaining access presents a dilemma for outsiders attempting community development. On the one hand, in an effort to remain open and inclusive, it is important to avoid alignment with particular individuals or groups within a community. On the other hand, gaining access necessitates one or more discrete entry points and by this very relation may constrain or bias other researcher-community relationships. These issues were relevant throughout this effort as researchers attempted to involve residents and stakeholders.

Another lesson is that *local buy-in and the identification of "champions" who will spread the word are vitally important* when working as outsiders within a community. These individuals will often be much more effective at generating support for an initiative than an outsider could ever be, and likely with much less effort invested. The Deer Lodge Community Group lacked a true champion from within the community. This likely contributed to the ultimate deterioration of the group.

A fourth lesson learned is that *it is essential to remain honest and open in all interactions* within the community. A large part of this effort was focused on building relationships among community members and between community members and researchers. Essential to relationship building is the element of trust. In the present case, participants had to trust the researchers and each other in order for the group to go forward together in an effort to make something happen for the community. However, it was impossible to begin the effort with full trust in one another; it had to be built together over time and the researchers made a purposeful effort to build trust (Muth 2004). One way this was addressed was by demonstrating that, although the researchers might be facilitating the process, both the process and its outcomes belonged to the community. In addition, researchers recognized the need to take the necessary time to build trust between participants. This can become an issue when working within the timeframes required by funding agencies and academic institutions.

Finally, *effective relationships between community members are paramount* to the community and its future. This supports the ideal behind the

interactional theory of community development. Efforts should be made throughout the community development process to nurture these relationships by providing opportunities for social interaction to occur. In the case of the Deer Lodge Community Group, a meal was served each time the group gathered. The fellowship time associated with sharing a meal provided the opportunity for group members to interact casually and to discuss day-to-day happenings.

Each of these points is essential to working effectively with rural communities. While some might not deem this community development effort "successful", the effort put forth by the committed members of the group and the relationships established between these individuals made it worthwhile. As mentioned previously, the value of interactional community development lies in "the efforts of people and not necessarily in goal achievement" (Wilkinson 1999: 87). This description of value can serve as a charge to all those engaged in community development efforts to focus on the people and relationships involved and not just development goals.

Given the recent emphasis placed on the devolution of authority to local or regional levels of governance, the capacity of rural communities to effectively utilize this authority is an important issue. Interactional community development offers a means by which researchers and community development practioners can assist rural communities in building civic capacity for local governance. The establishment of effective working relationships among residents and between residents and others with a significant interest in the community will likely be of

significant benefit to struggling rural communities. These relationships can serve as the foundation to work from when other issues arise.

Establishing relationships within communities and nurturing civic capacity are critical to community vitality in most rural areas and certainly in Deer Lodge, TN. Results of key informant and focus group interviews suggested limited social capital and trust, and a reluctance toward working together. However, results of the facilitated community group showed growth of social capital and culminated in a community grant application effort. The potential of improved local governance through an engaged civic sector is yet only a potential in Deer Lodge. However, key steps of building community relationships around community interests and taking community action have been taken.

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# PART 4: DRY CREEK AS A COMMON POOL RESOURCE: AN INSTITUTIONAL ANALYSIS OF PRIVATE LAND USE IN A WEST TENNESSEE WATERSHED

Part 2 of this dissertation provided an introduction to some of the problems with natural resource governance and discussed processes that have been developed to deal with those problems. This part presents a case study of the institutions influencing private land use in the Dry Creek watershed in Tennessee. All four of the shortfalls of natural resource governance discussed in Part 2 are manifested in the resource problems in this watershed.

Aspects of the physical environment, the community, and rules that influence private land use in this watershed are examined in the case study. The outcomes of these institutions are also evaluated. There are significant problems with equity, accountability, and adaptability. It is recommended that a process like those described in Part 2 could address these problems by developing a common understanding of the biophysical processes in the watershed and by building community capacity for addressing natural resource issues.

## Introduction

As scientists gain a better understanding of the complex interrelationships between components of ecosystems, it becomes more important to encourage the management of natural resources at a broader scale than has been accomplished in the past. Natural resources, including streams and wildlife, do not recognize political boundaries. Neighboring parcels are ecologically linked (Freyfogle 2003), and practices implemented on one piece of land affect adjoined landscapes. Management at a landscape scale is difficult, even in areas

composed of publicly owned land. However, in areas of multiple ownerships, the task becomes considerably more daunting (Campbell and Kittredge 1996).

There are many factors that influence land use, including the physical environment, demographics, economic incentives, and institutions. Institutions can be defined broadly as “sets of formal and informal rules and norms that shape interactions of humans with others and nature” (Agrawal and Gibson 1999). Institutions created to “mediate demographic and social pressures” (Poteete and Ostrom In press, p. 3) on natural resources are not always successful. In fact, many institutions produce perverse incentives, resulting in land use that is not ecologically sustainable. Institutions exist at many different levels, ranging from market incentives and informal rules within a community to well-defined government regulations. In the United States, the hierarchy of institutions is such that federal rules supercede state rules, state rules supercede county rules, and county rules supercede community rules. This centralization of authority has had the effect of nearly eliminating effective local institutions related to natural resources in many communities. Berkes and Folke (1994) note, “One of the reasons for the degradation of natural resources is the degradation of [local] institutions that once provided for their use” (p. 140). When centralized governments at either the state or federal level dictate the management of natural resources, it is impossible to successfully account for the range of communities and natural resource systems that exist within their jurisdiction. Costanza et al. (2001) argue, “The solution, then, is to match ecosystems and

governance systems in order to maximize the compatibility between these two types of systems." (p. 7)

This paper utilizes the Institutional Analysis and Development (IAD) framework to examine the institutions driving private land use in the Dry Creek watershed in West Tennessee. The IAD framework has been developed over the past several decades by researchers with the Workshop in Political Theory and Policy Analysis at Indiana University. The objectives of this paper are as follows: 1) to describe the various forces driving private land use and to evaluate the outcomes of these forces in the Dry Creek watershed utilizing the IAD framework; 2) to discuss the policy implications of this case study, including potential changes that could lead to improved outcomes; and 3) to comment on the usefulness of the IAD framework in studying resource issues like those present in the Dry Creek watershed.

## Common Pool Resources

From an institutional perspective, natural resources can be classified based on two major factors: exclusion and subtractability. Exclusion refers to the ability to prevent potential users from exploiting a resource or the ability to limit the exploitation by current users. Subtractability refers to the degree to which one person's use of a resource negatively affects another person's use of that same resource. Figure 3 illustrates the classification of goods, according to their relative ease of exclusion and subtractability. Public goods, such as street lamps, are characterized by difficulties with exclusion and low subtractability, while

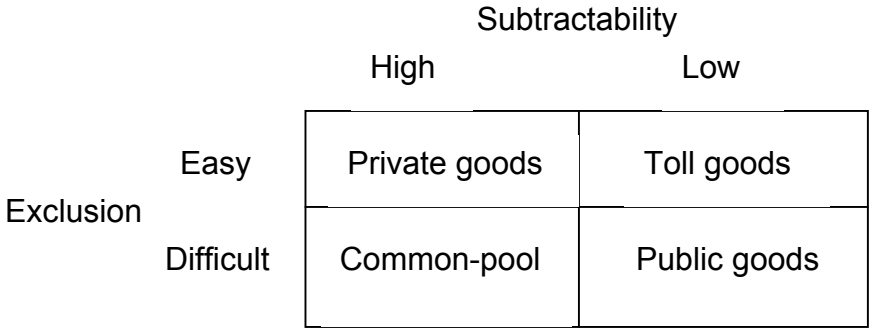


**Figure 3. Classification of Resources (from Ostrom et. al. 1994)**

private goods, such as fenced-in pastures, have easy exclusion and high subtractability. Toll, or club, goods have easy exclusion and low subtractability. An example of toll goods is parking spaces in a garage that only those with permits can enter. Researchers refer to the final category of resources as "common-pool resources" (CPRs). These resources are characterized by difficulties with exclusion and high subtractability (Ostrom et al. 1994). CPRs are often associated with common-property regimes in which property rights are held by a defined group of people or a certain community. However, rights to CPRs can also be held by individuals or governments (Hanna et al. 1996).

Resources typically studied as CPRs include fisheries, groundwater, and community-owned forests (see, for example Gibson and Koontz 1998; Gibson et al. 2000; Morrow and Hull 1996; Ostrom 1990; Ostrom 1999). However, the definition is broad enough to include environmental issues such as ecosystem degradation and global climate change (Hasselmann et al. 2003; Imperial 1999a; b).

River systems are not commonly thought of as CPRs; however, in certain cases, these systems fit the qualifications of difficulties with exclusion and high subtractability. For example, in West Tennessee, where the soils are highly erodible, activities on land anywhere in a watershed can result in soil erosion. The resulting deposition of sand and sediment in waterways and on the floodplain has negative effects on the ecosystem at large, including tree mortality, loss of wildlife habitat, degradation of water quality, and loss of recreational opportunities. In this case, it is difficult to exclude a "user" (i.e. landowner or farmer) from engaging activities that result in erosion, and the effects of this "use" are highly subtractable due to their negative impacts on other users (via sediment deposition, etc.). This is especially true given the existence of multiple sources of sediment, including upland gullies, forestry and agriculture activities, and stream beds and banks. Aylward and Gonzalez (1998) also classified sedimentation—in their case in the Rio Chiquito watershed of Costa Rica—as a CPR problem in their study utilizing the IAD framework.

Common-pool resources can be sustained over time as long as the supply of the resource is greater than the demand. However, when the demand becomes greater than the supply, restrictions must be placed on the users if the resource is to be sustained (Thomson 1997). In this study, the "supply" equates to the capacity of the river system to transport sediment. When the amount of sediment in the system exceeds this capacity, deposition occurs. Excessive amounts of deposition result in drastic changes to the river system (Diehl 1994)

and to the functionality of associated ecosystems, which also has significant impacts on the local economy (Wells and Pierce In preparation).

### Institutions and the Institutional Analysis and Development Framework

Institutions, defined earlier as "sets of formal and informal rules and norms that shape interactions of humans with others and nature" (Agrawal and Gibson 1999, p. 637), guide human activity in society. Institutions include forces as varied as international markets and individual families—anything that has an effect on human activity. By studying the institutions relevant to a particular policy situation, researchers can better understand how that problem has developed, how it has been addressed, and how it could be addressed. Imperial (1999b) states, "Institutional analysis is therefore an attempt to examine a problem that a group of individuals (or organizations) face and how the rules they adopt address a problem(s)" (p. 454).

The IAD framework offers a systematic means by which to examine the various institutions in a given place. It requires the examination of the attributes of the natural world, the community, and the rules that influence activity. It also offers criteria for the evaluation of the outcomes of an institutional setting. The IAD framework has been applied to many types of policy situations, from CPR problems (e.g. Gibson and Koontz 1998; Gibson et al. 2000; Imperial 1999b; Ostrom 1992) to metropolitan organization (e.g. Advisory Commission on Intergovernmental Relations 1988; Ostrom et al. 1988) and privatization of fertilizer distribution (Oakerson et al. 1990).

The IAD framework offers several advantages in the analysis of private land use. Its focus on rules, both official and unofficial, requires the examination of the regulations as well as the cultural influences driving land use. In addition, the use of a common framework for analysis provides the opportunity for comparison across cases. The IAD framework has rarely been utilized in the analysis of natural resource problems on private lands where no mechanisms or incentives for collective action exist. Thus, its application in this study adds to the number of cases that have utilized the framework while offering insights into its applicability to private land issues.

The basic unit of analysis in IAD is termed an "action arena." It includes an action situation and actors, which are influenced by the physical environment, the local community, and rules. Figure 4 (adapted from Ostrom 1986; Ostrom et al. 1994) depicts the basic components of the IAD framework.

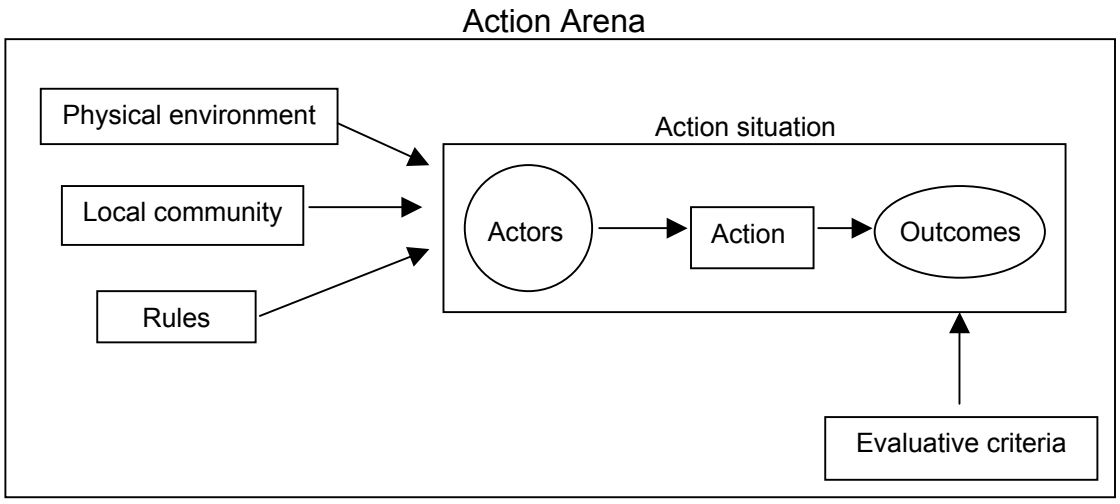


**Figure 4. The Institutional Analysis and Development Framework (adapted from Ostrom 1986; Ostrom et al. 1994)**

For the purposes of this research, the action arena is the Dry Creek watershed, including all of its physical, social, political, economic, and human characteristics. The action situation of interest is private land use in this watershed.

The physical environment limits the range of activities to be taken, affects the likelihood of various outcomes, determines the knowledge needed and available, and affects the link between actions and outcomes (Ostrom et al. 1994).

Several attributes of the local community have an impact on the action arena, including what is seen as acceptable behavior, the way in which resources are distributed between members of the community, the degree of agreement about the structure of the action arena, and the consistency of values within the community (Ostrom et al. 1994).

Various types of rules affect the action arena by limiting or prescribing actions to be taken. Costanza et al. (2001) note, “Rules in-use are enforceable constraints on actions and outcomes placed by humans on themselves and others. These rules exist at multiple levels, and always in the context of the community in which they are jointly understood and enforced.” (p. 17)

The outcomes of an action situation can be evaluated according to several different criteria. One primary criterion is efficiency, including economic efficiency and administrative efficiency. The equity of outcomes is another criterion to consider. Equity can be thought of in terms of temporal, spatial, and financial equity. Outcomes can also be evaluated in terms of their accountability, meaning

that officials or leaders can be held responsible for ensuring that outcomes are both equitable and efficient and that users are held accountable to one another. The adaptability of institutions to changes in the action situation is also an important criterion to examine (Imperial 1999a; b; Ostrom 1998; Ostrom et al. 1994).

## Methods

While the IAD framework does not specify the methodology to be employed, it does specify the types of information needed to complete the analysis. This information is summarized in Appendix 1. For this study, it was determined that a case study approach would offer the best means by which to examine the action arena. Data collection was qualitative in nature, including semi-structured interviews, focus group interviews, and document review. Semi-structured interviews were conducted with natural resource professionals, landowners and agricultural producers in the Dry Creek watershed, and other stakeholders familiar with the area. Focus group interviews were conducted with landowners and residents of the Dry Creek watershed. Questions in these interviews were structured based upon guidelines and forms developed as part of the International Forestry Resources and Institutions (IFRI) Research Program, which utilizes the IAD approach to study forest management institutions around the world (Ostrom and Wertime 1995).

**The Dry Creek Watershed**

The study site includes two tributaries of the Hatchie River, encompassing all of the Dry Creek watershed and that part of the Clover Creek watershed that is below Dry Creek. Figure 5 identifies the location of Dry Creek within the Hatchie River watershed.

The Hatchie River system is unique in the Lower Mississippi Alluvial Valley because its main channel has not been straightened and deepened through a process called channelization. However, many tributaries of the Hatchie, including Clover and Dry Creeks, were channelized in the early to mid-1900s to speed the drainage of floodwater off agricultural lands. This channelization has had many unforeseen effects. The most significant of these is the acceleration of sediment deposition. Since the water moves more quickly through the channelized tributaries, the sediment it carries with it remains

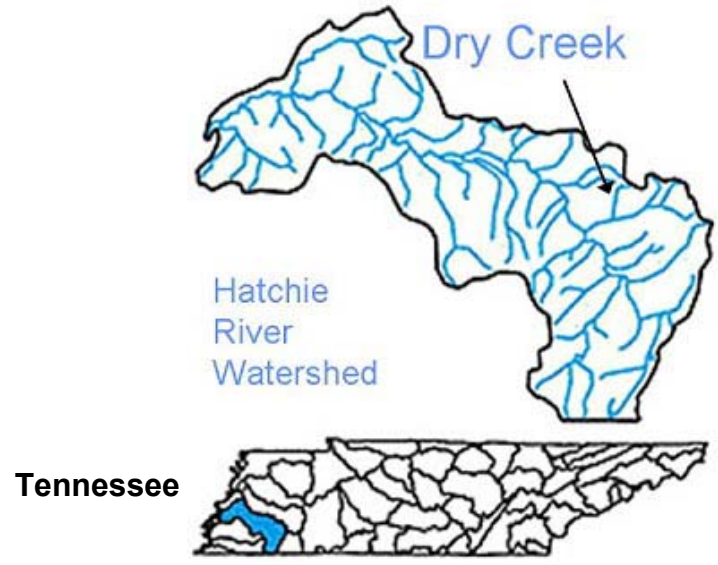


**Figure 5. Map of Hatchie River Watershed. Source: TN Dept. of Environment and Conservation (1998b)**

suspended in the stream. The sediment drops out when it hits slower moving water at a confluence or due to debris in the channel. Over time, this deposition can result in the formation of a valley plug, which essentially blocks the stream, forcing the water out over the bottomlands (Diehl 1994; 2000; Pierce and King 2004).

This flooding has resulted in a shift in the forest composition in the bottomlands from valuable hardwoods species, such as Sweetgum (*Liquidambar styraciflua*) and several different types of oaks, to less valuable species, such as Red Maple (*Acer rubrum*) and Black Willow (*Salix nigra*). Wells and Pierce (In preparation) have estimated the cost of damages to the bottomland hardwood forests due to channelization to be over $11,000 per hectare in the Hatchie River watershed. This represents huge economic losses for forest landowners.

Excessive sedimentation has also resulted in the formation of shoals in the Hatchie River at the mouths of several tributaries, including Clover Creek. These shoals are characterized by a sharp decrease in channel depth. The shoals hinder navigation of the river and sometimes cause the formation of a secondary channel as the water searches for a way around the shoal. These channels normally return to the main channel below the shoal (Diehl 2000).

## Institutional Arrangements Governing Private Land Use in the Dry Creek Watershed

The problem of interest in this paper is how to decrease sedimentation in the Hatchie River coming from the Dry Creek watershed. There are several actions, or patterns of behavior, that have contributed to this problem.

Channelization, as described earlier, has caused the water to move faster and transport sediment more efficiently. Current and past agricultural practices, including tillage and allowing livestock access to creeks, have resulted in significant erosion from fields and from within creeks. Poor forest harvesting practices have also contributed to erosion. Finally, a lack of local governance mechanisms has prevented local residents from collectively addressing the sedimentation problem.

## Variables Influencing the Action Situation

### *Attributes of the Physical Environment*

The Dry Creek watershed encompasses approximately 12,000 acres in Hardeman and Madison Counties, Tennessee. It falls within the Southern Mississippi Valley Silty Uplands major land resource area, which is characterized by loess soils over sandy, silty subsoils. The terrain is gently rolling and well-suited to agriculture (USDA Soil Conservation Service 1986). However, the loess soil layer is highly erodible, and the sandy subsoils have been exposed due to the clearing of land for agriculture and past tillage practices (Diehl 2000; Pierce and King 2004). The exposed sand is also subject to erosion, and many gullies have formed in the watershed. Conversion of most producers to conservation tillage practices has reduced the amount of erosion off of agricultural lands, but gulleys continue to contribute sand and sediment.

The channelization of both Dry and Clover Creeks intensified problems associated with soil erosion by increasing the velocity in many streams. The

increased velocity accelerates rates of erosion within the channel and concentrates deposition in areas of slower moving water, often resulting in valley plugs or shoals, as described earlier (Diehl 2000).

*Attributes of the Community*

The Dry Creek area was once the home of the Chickasaw Indians. A treaty signed in 1818 opened the area for settlement by European Americans, with the land officially transferred to the federal government in 1823. The first non-native settlers in the area came from other parts of Tennessee and from surrounding states. They were attracted by promises of fertile land and economic opportunities. The soil was particularly well suited for growing cotton, and the Hatchie River provided easy access to markets in Memphis and New Orleans (Deming 1958).

Over time, communities developed to provide support for agriculture. The Cloverport community sprang up at the mouth of Clover Creek and once served as a port. As alternative modes of transportation developed, the Hatchie River became less important for transporting goods.

The Dry Creek watershed remains rural and sparsely populated. Primary present-day economic activities include forestry and agriculture. Hardeman County, in which most of the watershed lies, averages among the top counties in the state in hardwood sawtimber removals (Schweitzer 2000).

Recent years have seen a consolidation of farming operations, leaving a handful of producers to farm the majority of the land. The land itself tends to be

passed on from generation to generation within a family, but the land is leased by producers, some of which travel over 50 miles to farm the land. Many residents of the Dry Creek watershed now drive to the larger cities of Jackson and Memphis to seek employment opportunities.

Local communities, once home to farm stores, cotton gins, and other agriculture-based businesses, have experienced a decline due to the shifts in employment away from agriculture. This decline, along with the fact that many residents have strong ties to other areas based on jobs and schools, has resulted in few opportunities for interaction among residents. Churches were mentioned as the primary places where local residents interact.

While cultural norms influencing the care of the land once were prominent, this is no longer the case. When land was farmed by its owners rather than leased, the farmer's identity was tied to the land and he or she took pride in caring for it. Producers now farm so much acreage that there is little time for mowing fence rows or other activities that do not directly influence the success of the crop. Agrawal (2002) also noted the disappearance of cultural norms in industrialized societies. He saw this as "an integral if perhaps regrettable part of progress" (Agrawal 2002, p. 42).

There have been a small number of disputes among residents of the Dry Creek watershed. These have primarily been related to property boundaries and concern about changes in land cover.

*Attributes of Rules*

Land in the Dry Creek watershed is nearly entirely privately owned. Thus, private property rights are important rules influencing land use. Private property can be defined as "property owned by individuals holding rights to use (in socially acceptable ways), dispose of, and exclude others from resources" (Cole 2002: 8). These rights are constrained by the rights of neighboring landowners to do the same things on their land. Nuisance lawsuits are becoming more common throughout the United States as the goals of neighboring landowners come into conflict (Freyfogle 2003). Property rights can also be viewed as a "bundle of rights," which may include the right to hunt on the land, the right to farm it, or the right to build on it. Increasingly, these different rights are sold or leased out individually (Freyfogle 2003).

As mentioned previously, most of the farmland in the area is farmed by producers who lease this right from landowners. These leases are often verbal agreements between the landowner and the producer. Two types of arrangements predominate: cash leases and share leases. With a cash lease, the producer pays the landowner a set amount per acre. In the Dry Creek area, these payments can range from $25-$150 per acre per year, depending upon soil type and productivity. With a share lease, the landowner receives a percentage of the market value of what is produced on the land. This percentage is usually around 25%. If this rate is higher than 25%, the landowner is typically required to contribute some sort of inputs (i.e. seed, fertilizer) toward crop production. The primary benefit of a share lease for the landowner is that when prices are high,

he or she receives a great amount of money. However, when prices are low, the landowner receives a smaller payment. The cash lease guarantees a payment.

Hunting leases are becoming more popular in the Dry Creek watershed. These leases are nearly always written agreements that specify the species that can be hunted. Lease rates can range from $1-15 per acre per season, depending on the size of the parcel, the quality of habitat, and the number of game species included in the lease.

The federal Clean Water Act stipulates that all states must establish programs to address non-point source pollution associated with forestry and agricultural activities. These programs can be regulatory or non-regulatory. In Tennessee, the program is non-regulatory, relying on education, technical assistance, and cost-share programs to address non-point source pollution (Tennessee Department of Agriculture Division of Forestry 2003). To address agricultural runoff, the state funds best management practice (BMP) implementation projects, monitoring projects, and educational projects through the Tennessee Department of Agriculture's Non-Point Source Program. In addition, the Agricultural Resources Conservation Fund provides cost-share assistance to landowners for implementing BMPs and provides funding for statewide educational efforts (Tennessee Department of Agriculture 2005).

To address runoff from silvicultural activities, the state initiated the Master Logger Program in 1992 as a means to educate loggers. To be certified as a Master Logger, an individual must complete a five day training cycle, including the following topics: safety, forestry BMPs, silviculture, and business

management. To retain certification, continuing education credits must be earned. Master Loggers receive a completion certificate which can be shown to potential clients as proof of their qualifications (Clatterbuck and Hopper 1996). The Tennessee Division of Forestry also periodically releases a “Guide to Forestry Best Management Practices in Tennessee.” This guide provides detailed information about the many BMPs that have been developed and specifies the conditions under which they should be used.

Agricultural and forestry activities are generally exempt from permitting required under the Tennessee Water Quality Control Act. However, amendments made to the Act in 2000 grant the Commissioner of the state Department of Environment and Conservation the power to issue stop work orders to logging activities in certain situations. For a stop work order to be issued, the logger must not be utilizing BMPs, a point source discharge must have resulted from the activity, and pollution of waters must have resulted from the activity. Prior to a stop work order being issued, loggers are generally given the opportunity to come into compliance. Following issuance, the stop work order remains in effect until the logger comes into compliance. In addition, the logger must notify officials of any new harvesting activity undertaken for the following two years (Tennessee Department of Agriculture Division of Forestry 2003).

Most farmland in the Dry Creek area is enrolled in federal farm support programs through the United States Department of Agriculture’s Farm Service Agency. Enrollment requires the land to be farmed according to a farm plan developed by the Natural Resources Conservation Service. This plan typically

specifies the type of tillage and cover crops required based on the slope of the land, the soil type, and other factors. The rules associated with these programs change with the passage of each new Farm Bill.

Under the 2002 Farm Bill, there are two types of payments: direct payments and counter cyclical payments. These payments are tied to the land, but are paid to the person who farms it. Some lease arrangements require the producer to pay the landowner the government payment in addition to a rent payment. Direct payments require an annual sign up and are tied to “base acres”, which were established in the 1980s as the number of acres planted per farm in a given crop. Each farm has a set number of base acres attached to it for each crop. Direct payments for a given crop are calculated by multiplying the number of base acres for that crop by 85%, then multiplying by the average yield for that crop, then multiplying by the payment rate for that crop. For most crops, average yields were established for each farm in the 1980s. Direct payments do not require that the land be planted according to the number of base acres established for each crop. Rather, a producer is free to plant whatever crops he or she chooses, based on market conditions. Additionally, direct payments do not require that the land be planted at all (Economic Research Service 2002).

Counter cyclical payments essentially provide a floor for crop prices. If the average market price over the past 12 months is less than the loan rate, then the producer receives a payment equal to the difference between the market rate and the loan rate. If the average market value over the past 12 months is greater

than the loan rate, the producer does not receive a payment. Loan rates are specified in Farm Bill legislation for each crop.

Several incentive programs are administered by USDA's Natural Resources Conservation Service to encourage landowners to engage in conservation practices. These include federal cost share programs, such as the Environmental Quality Incentives Program (EQIP) and the Wildlife Habitat Incentive Program (WHIP) and land retirement programs, such as the Conservation Reserve Program (CRP) and the Wetlands Reserve Program (WRP). Enrollment requirements and incentives offered differ across programs (USDA Natural Resources Conservation Service 2005b). Details on those programs which are of importance in the Dry Creek watershed can be found in Appendix 2.

The US Army Corps of Engineers has jurisdiction over all "blue line streams." These are all streams that show up as a blue line on a 7.5-minute United States Geological Survey (USGS) quadrangle topographic map. Alteration of these streams is prohibited without a special permit. However, removal of debris from the channel is allowed. There are no regulations regarding farm ditches.

Markets exist for agricultural products, forest products, and real estate. These markets all operate under the U.S. free market economic system in which supply and demand are the primary forces driving prices. There is little local control over prices due to the increasingly globalized nature of markets,

especially for agricultural and forest products. Markets have driven shifts in the crops planted and in land use from agriculture to forest.

## Evaluation of Outcomes of Current Institutional Arrangements in Dry Creek Watershed

As mentioned previously, within the IAD framework there are four primary criteria for evaluating institutional performance. These include efficiency, equity, accountability, and adaptability (Imperial 1999a). The quantification of the outcomes according to these criteria is beyond the scope of this study, but a discussion of these criteria as they pertain to the outcomes of the action situation offers some insight into the relative effectiveness of the current institutional arrangements.

### Efficiency

Efficiency refers to both economic and administrative efficiency. The current institutional arrangement governing private land use in the Dry Creek Watershed can be described as fairly efficient. Private property rights are well established and respected by the majority of the actors, thus keeping costs of enforcement down. Lease agreements for both agricultural and recreational uses of the land are viewed as being economically efficient for both landowner and leaseholder.

The voluntary nature of the federal farm programs helps to keep administrative costs down. While it is difficult to directly attribute changes in agricultural practices to a single influence, these programs are generally

considered to be effective incentives for farmers to engage in conservation practices (Claassen 2004). The economic efficiency of federal farm programs is difficult to determine and remains unclear (Claassen et al. 2001). In the Dry Creek watershed, the Conservation Reserve Program (CRP) has been especially effective in taking highly erodible land out of production. However, these programs require a great deal of paperwork, and programs change with each fiscal year, which decreases administrative efficiency. Many landowners expressed frustration with the enrollment process.

The voluntary nature of best management practices (BMPs) also helps to keep administrative costs down. Education appears to have a positive impact on the utilization of BMPs. A 2003 study of BMP implementation in logging activities on non-industrial private forestland in Tennessee found that Master Loggers are more likely to implement BMPs than those loggers who have not participated in the program (Davis and Clatterbuck 2003). According to the Tennessee Forestry Association website, more than 1400 loggers have been educated over the life of the program (Tennessee Forestry Association 2004). As more loggers are educated, it is hoped the BMP usage will become even more widespread across the state. One participant noted that his training and subsequent certification as a Master Logger had increased his awareness of BMPs and served as an effective marketing tool. That is, some landowners are willing to pay a premium price to hire a Master Logger.

Agricultural BMPs are also voluntary, but no information could be found regarding implementation or effectiveness in the Dry Creek watershed.

**Equity**

The outcomes of the current institutional arrangement cannot be classified as equitable temporally, spatially, or financially. Landowners whose property is affected by sedimentation are often not the ones who have caused the problem. The impacts are temporally and spatially disconnected from the source of the sediment. The costs of “sink” landowners, primarily in the form of timber mortality and loss of productive land, are much higher than landowners whose property is the “source” of the sediment. Landowners with property in these “sink” areas expressed great concern about the losses they have already experienced due to excessive sedimentation and could experience in the future if the problem is not addressed.

Additionally those “source” landowners who voluntarily engage in practices to reduce sedimentation do not receive all the benefits associated with this investment. These landowners will likely receive some benefits associated with the retention of fertile topsoil, but those landowners whose property serves as a “sink” also receive benefits due to reduced sediment loads in the creeks. While most landowners and producers expressed a strong stewardship ethic, the costs of some practices needed to address sedimentation are prohibitive. No mechanisms, market or otherwise, currently exist by which the costs and benefits associated with reduced erosion can be redistributed.

**Accountability**

Accountability can be viewed in terms of the accountability of government officials and agency employees to ensure the welfare of citizens. Additionally, accountability can be viewed in terms of one user being held accountable to another user. While mechanisms do exist to ensure that government officials are held accountable for their actions and for enforcing regulations, these mechanisms can be complex and difficult for an average citizen to access because they often take the form of complex reporting or complaint procedures.

One aspect of private property rights serves to hold neighboring landowners accountable to one another; that is, a landowner's rights are limited by those of neighboring landowners. This is enforced in the U.S. via nuisance law, in which a landowner can sue a neighboring landowner to stop an activity that might negatively affect the value of his or her land (Freyfogle 2003).

The voluntary nature of both forestry and agricultural BMPs makes it impossible to hold users legally accountable for actions or inaction that result in significant erosion. The only means by which this can be done is if the action results in a point source of pollution, after which it falls under restrictions of the Tennessee Water Quality Act.

While lease agreements establish accountability between landowners and producers, they normally do not include provisions regarding the implementation of conservation practices. Studies have found producers are less likely to engage in practices with long term conservation benefits when they are leasing the land, even if the lease agreement is long-term (more than 10 years) (Fraser 2004).

Currently, lease agreements are the only mechanisms by which users are held accountable to one another. A major weakness in the current institutional arrangement, and a failing of government, is the lack of accountability between upstream and downstream users.

### Adaptability

The current institutional arrangements are not adaptable. Federal agricultural programs are established at the national level with little room for tailoring to local conditions. Wetland and drainage regulations are established at the state and federal level. There are currently no established mechanisms at the local level for addressing local environmental problems. Additionally, the lack of frequent interaction among local residents and stakeholders makes it difficult for them to share information about resource issues or problems.

Local culture has adapted to changes in the agricultural industry and could potentially adapt to future changes. Additionally, markets are constantly adapting, and the potential exists for markets to encourage sustainability. However, this potential is not currently being realized.

## Policy Implications

This paper has documented a situation in which current institutions have failed to address a significant natural resource problem: sedimentation in the Dry Creek watershed. This problem is a common pool resource issue because it is difficult to exclude users from inputting sediment into the system and because benefits associated with the effective transport of sediment by the creek are

subtractable (*i.e*. one user's sediment input decreases another user's ability to input sediment without negatively affecting the ability of the creek to effectively transport the sediment load). The outcomes of the situation, while fairly efficient, are not equitable or adaptable and do not allow for accountability among users. This is likely the situation in most watersheds in the United States in which sedimentation is a problem and private land dominates the landscape.

There are several ways in which the institutions could be changed to offer better incentives for engaging in practices that would reduce sedimentation in the Hatchie River watershed. Regulations could be implemented, making BMPs mandatory and requiring landowners to implement in-stream restoration tools. Governmental agencies or other organizations could initiate programs focused on educating landowners and producers about the problem and about what can be done to address it, with the hopes that increased understanding will provide incentive for behavior change. Economic and technical assistance specifically targeted as addressing sedimentation could be offered from governmental agencies or other organizations to encourage users to engage in conservation practices and restoration efforts. Finally, mechanisms of governance could be established at the watershed scale by which information could be shared among users and the costs and benefits of conservation activities and restoration work could be redistributed between source and sink users.

The final option would likely lead to at least some collective action by users throughout the watershed to establish institutions or rules to address sedimentation. It also offers the opportunity "…to match ecosystems and

governance systems in order to maximize the compatibility between these two types of systems" (Costanza et al. 2001: 7). Such institutions do not currently exist and could more directly address problems of equity, adaptability, and accountability than the other three policy options.

Several studies have indicated that common-pool resources have successfully been managed collectively over the long term, primarily due to collective action on behalf of resource users to develop their own rules governing the management of the resource. The resulting institutions are often more efficient, equitable, adaptable, and accountable than other governing mechanisms (McKean 1992; Ostrom et al. 1994; Poteete and Ostrom In press; Thomson 1997). Additionally, many researchers, practitioners, and governing officials are currently advocating the devolution of authority to local levels, at which governance mechanisms can be established that are based on local circumstances, adaptable to change, and involve citizens collaboratively in the development of policies (Booher and Innes 2002; Daniels and Cheng 2004; Daniels and Walker 1996; 2001; Innes and Booher 1999; Karkkainen et al. 2000). Collectively, these factors suggest that the timing is ideal for stimulating collective action among users in the Dry Creek watershed with the hopes that they will be able to take advantage of opportunities associated with the devolution of authority.

Ostrom (1999) compiles a list of resource and user attributes that have been found in systems where collective action has emerged as a means to effectively manage a CPR. These attributes, listed and briefly described in Figure

6, are also cited in Poteete and Ostrom (In press) and Imperial (1999b). Additionally, Ostrom (1990) cites several “design principles” of institutions for the sustainable management of CPRs. These are essentially characteristics of institutions that have been found to be associated with successful, long-term management of CPRs. They are listed and briefly described in Figure 7. It is useful to assess the situation in the Dry Creek watershed according to these attributes (Figure 6) and design principles (Figure 7) to determine where outside resources might be directed with the goal of stimulating collective action by users toward the development of local governance mechanisms.

There is a need for indicators (Figure 6, Number 2) and monitoring (Figure 7, Number 4) of the rates and impacts of erosion and sedimentation throughout the watershed. A long-term monitoring program is needed to determine the effectiveness of conservation practices or structures that might be implemented. It will be important to involve users in the development and implementation of monitoring programs. Participation by users will help to increase communication among users and between users and agencies, to increase the capacity of the users to understand and propose ways to address sedimentation problems, and to transfer ownership of and responsibility for the problems to the users.

Much information about biophysical conditions in the Dry Creek and the Hatchie River watersheds is available. However, users are likely unaware of how to access it or that it even exists. Biophysical studies have been conducted by several different agencies and researchers over the past 25 years (see for example Diehl 1994; Diehl 2000; USDA Soil Conservation Service 1986).

**Attributes of the Resource**

1. *Feasible improvement*. The resource is not degraded to the extent that it is futile to try to address problems AND the resources is not under so little stress that addressing problems will be of little value.
2. *Indicators.* Information about the condition of the resource is available to users and is also accurate and affordable to obtain.
3. *Predictability*. The availability of resource units must be predictable.
4. *Spatial extent*. The resource must be small enough that it is feasible for users to obtain accurate knowledge of the boundaries and the processes impacting the resource.

**Attributes of the Users**

5. *Salience*. The CPR problem must be relevant to the users. It must negatively impact their livelihood or other values they place on the resource (i.e. recreational uses).
6. *Common understanding*. Users need to be in agreement about the status of the resource and the effects of their decisions on other users and on the resource.
7. *Discount rate*. Users must have a sufficiently low discount rate in relation to future benefits to be achieved from the resource.
8. *Distribution of interests*. Those users with greater levels of financial wealth and political influence are also, or could be, negatively affected by resource problems.
9. *Trust*. Relationships among users must be strong enough that at least a minimal level of trust and commonality exists. They must feel confident that other users will keep their word and adhere to agreements.
10. *Autonomy*. Users must have the legal authority to establish self-governing mechanisms
11. *Prior organizational experience*. Users must have some experience with self-organization or have a means to develop the skills needed to effectively organize to address an issue within their community.

**Figure 6. Key Attributes Found in Successful Collective Action (from Ostrom 1999)**

1. *Clearly defined boundaries*. The boundaries of the CPR and who has rights to the resource must be clearly defined.
2. *Proportional equivalence between benefits and costs*. Rules reflect local conditions and allocations of benefits are based on inputs of labor, materials, or money.
3. *Collective-choice arrangements*. The majority of individuals affected by the rules are able to participate in the development and revision of the rules.
4. *Monitoring*. The conditions of the CPR and the actions of the users are routinely monitored by individuals who are accountable to the users.
5. *Graduated sanctions*. Users who violate the rules are subject to sanctions based on the severity and context of the violation.
6. *Conflict-resolution mechanisms*. Users have access to mechanisms by which disagreements can be resolved.
7. *Minimal recognition of rights to organize*. Users have the right to develop their own institutions, and this right is not challenged by external entities.
8. *Nested enterprises*. Institutions governing the CPR, while locally developed, are compatible with institutions at higher and lower levels of governance.

**Figure 7. Design Principles of Institutions for Sustainable Governance of CPRs (from Becker and Ostrom 1995; Ostrom 1990)**

Additionally, ecological and hydrological studies are currently being conducted that will add to the understanding of processes and their outcomes in the Dry Creek watershed. It is critical to develop processes by which to make users aware of the findings of these and any future studies. Efforts to increase both the amount of information available and the accessibility of this information to users would be worthwhile pursuits for agency personnel, as well as non-governmental organizations with an interest in the area. The compilation of information from the various sources from which it is available would also be an asset.

Efforts to educate users about the sources of sediment and about the current and potential future impacts of sedimentation are needed to develop a common understanding (Figure 6, Number 6) among users regarding the status of the resource and about the impacts of various activities within the watershed. These efforts would also address the need for all users to feel that the problems are salient (Figure 6, Number 5). Due to the fact that the impacts of erosion and sedimentation tend to be concentrated in certain areas, many users do not feel that the problems are relevant to them, and currently, no mechanisms exist by which to increase salience among those not directly affected. Therefore, further incentives, financial or otherwise, would be needed to increase salience among users throughout the Dry Creek watershed.

There is also a need to increase trust among users (Figure 6, Number 9). Trust between users in the Dry Creek watershed varies depending upon the familiarity of individual users with one another. Trust between landowners and their farm leaseholders is very high, as evidenced by the fact that most lease agreements are verbal contracts. However longtime residents tend to be less trusting of individuals who have more recently purchased property or moved to the area. Efforts to build trust among all users would be necessary to ensure users that agreements would be honored.

Users have little experience with self-organization (Figure 6, Number 11). Participants in this study cited few instances in which residents of communities in the Dry Creek watershed have come together with a common goal. In the 1970s, residents in an area adjacent to the watershed successfully organized to sue

Velsicol Chemical Company for damages in relation to an illegal toxic chemical dumping site in the area (U.S. Environmental Protection Agency 2004). Many participants in this study referred to this class action lawsuit when asked about prior organization in the area. However, no other significant organizational efforts were cited, and it is unclear whether any current users were involved in that effort.

Education and skill development activities related to community development and conflict resolution practices (Figure 7, Number 6) should be part of a collective action strategy. Though there have been few conflicts between users, the potential for conflicts to arise during the process of developing local governance mechanisms is great due to the complex nature of the problem and the uneven distribution of costs and benefits associated with erosion and sedimentation. There must be a process by which conflicts can be efficiently and equitably resolved.

Establishing relationships with other communities that have successfully organized would be beneficial and provide users with experienced contacts. Federal and state agencies, as well as non-governmental organizations, may be a source of the resources necessary to assist users in these efforts. There is also a need for these agencies and organizations to assume a role in facilitating local involvement in decision-making and in building organizational capacity in local communities.

Finally, there must be coordination among different levels of government to ensure that governance mechanisms developed are compatible with existing

regulations and will be recognized by governmental authorities (Figure 6, Number 10 and Figure 7, Numbers 7 and 8). Natural resources have historically been governed at the state and federal levels. However, a new, non-regulatory role emerges for these agencies when groups of local users work collectively to develop local governance arrangements. These agencies become sources of financial and technical assistance and can help groups to access resources from other agencies or from non-governmental organizations (Ostermeier 1999). These agencies also must offer assurance that agreements will be recognized and supported by county, state, and federal officials, otherwise there is no incentive for users to act collectively.

### Utility of the Institutional Analysis and Development Framework

The Institutional Analysis and Development (IAD) Framework and associated common pool resource literature offer an effective means by which to examine problems like those found in the Dry Creek watershed. The examination of the biophysical, social, and political contributors to problems provides a more comprehensive picture of the issue and highlights the linkages between ecological, social, and political systems. This results in a better understanding from which to make policy suggestions. Additionally, the IAD framework helps to identify the basic institutional failings which are often at the heart of natural resource problems. Often these failings are overlooked in efforts to “fix” natural resource problems. These technical solutions are not likely to be sustainable unless the underlying institutional problems are also addressed.

While more case studies of CPR problems in areas of privately owned property are needed, the results of this study indicates that the IAD approach can effectively be applied to these problems and result in a valuable evaluation of the outcomes of current institutional arrangements.

## Conclusion

This case study of the institutions driving private land use in the Dry Creek watershed in Tennessee found that the outcomes of these institutions are not equitable or adaptable and do not hold users accountable to one another. The sedimentation problem in the Dry Creek watershed is a systems-level problem, whose source can be traced to attributes of the resource, the community, *and* the rules governing land use.

Any changes to these three factors will be most effective if they utilize the full set of resources available, including those of state and federal agencies, markets, non-governmental organizations, stakeholders, and users. The development of local governance mechanisms that are effectively integrated with existing state and federal regulations and build upon existing market mechanisms should be nurtured by state and federal agencies and by non-governmental organizations in the civil sector. Government agencies have the opportunity to adapt their roles in the management of natural resources toward becoming educators, sources of information and incentives, and cultivators of local governance.

Only when the many different levels of governance (local, state, federal) and the many sources of information (users, stakeholders, non-governmental organizations, government agencies) are integrated and applied to local situations can we effectively "…match ecosystems and governance systems…" (Costanza et al. 2001, p. 7) and begin to more sustainably manage natural resources, especially in landscapes that are predominately privately owned.

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## Appendix 1. Types of Information Required for Analysis According to IAD Framework

Components of the action situation (Ostrom 1986; 1998)

1. Set of participants/actors
    - Which individuals (and how many) could potentially input sediment into or otherwise affect the resource system? (basically the full set of "users")
    - What positions or roles do individuals fill (e.g. member of farmers' co-op, natural resource professionals, etc.)?
    - Do participants act on their own or do they confer with others before acting? If so, whom do they consult?
    - What resources do actors access when making land use decisions and in implementing these decisions?
    - What are the actors' valuations of the Hatchie River system and of actions that affect this system?
2. Each participant's set of allowable actions, as defined by the rules
    - See section on rules below
3. Each participant's information about the action situation
    - Are participants informed about the condition of the river system and the effects of sedimentation on the system?
    - Is reliable information available to actors in forms they can use?
    - Do actors actually use the information that is available to them?
    - Is there an understanding of the cost and benefits related to certain land uses that other participants face? Of the cumulative outcomes produced by actions of individual participants?
    - What method do actors use to select their actions?
4. The outcomes, or states of the world, that can result from the action situation
    - What geographic region and what activities in that region are affected by the actions of participants?
5. The technologies or other links by which actions determine outcomes
    - What types of farming technologies are used?
    - What types of forestry technologies are used?
    - How do these contribute to soil erosion? How have they helped to decrease soil erosion?
    - What types of restoration strategies have been implemented and what have the effects of these been?
6. The costs and benefits of actions and outcomes for participants
    - What are the direct costs and benefits of each individual's possible actions? (i.e. what are the costs and benefits associated with the decision to plant crops or to plant trees on a certain piece of land?)
    - What group costs or benefits result from the various outcomes?
    - Who gains and who loses as a result of certain actions?

Community attributes (Ostrom 1986; 1998)

1. Behavioral norms
   - Are there generally accepted norms of behavior regarding potential actions?
2. Level and nature of common understanding shared by participants
   - Do users have a shared image of the resource regarding the attributes listed above?
   - Do users have a shared image of how their actions affect each other and the resource?
3. Extent to which those living in the community have homogeneous preferences
   - Do community members have the same preferences regarding potential actions?
4. Distribution of resources
   - How are resources distributed among users?
   - Do certain users have authority over larger amounts of land?

Rules (Ostrom 1986; 1998; Ostrom et al. 1994)

1. Boundary rules
   - How does one become an actor or come to have influence on the river system?
   - Over what geographic area does each actor have jurisdiction?
2. Position rules
   - Are there different levels of authority among users?
   - How does one change positions within the group of participants?
3. Scope rules
   - What states of the Hatchie River system can be affected by actions? What are the limits of how these can be affected?
4. Authority rules
   - What actions can be taken by actors in each of the various positions?
   - What regulations limit the choices available to landowners and/or farmers?
5. Information rules
   - What types of information are available to actors in each of the various positions?
   - How is information disseminated? What are the channels of communication between different actors?
   - What type of language (technical vs. common language) is to be used?
6. Aggregation rules
   - Only relevant if there is a means to make collective decisions.
7. Payoff rules
   - Are positive rewards offered for certain actions?
   - Are there sanctions for breaking any of the rules?

- How is compliance monitored?
- Do actors in different positions receive different levels of costs and benefits?

Evaluation of outcomes (Ostrom 1998; Ostrom et al. 1993)

- Are the outcomes of the current institutional arrangements economically efficient? Does this differ across the different types of participants?
- Are the outcomes of the current institutional arrangements equitable, in a financial sense? Does this differ across the different types of participants?
- Were the current institutional arrangements established via a process that is considered by those involved to be fair?
- Are the rules-in-use adaptable to changes in the resource or the community?
- Can those who make and enforce the rules be held accountable for doing so in a fair and efficient manner?

## Appendix 2. Summary of Federal Farm Programs of Importance in the Dry Creek watershed

### Conservation Reserve Program (CRP)

*Purpose/Goal*: To reduce soil erosion, establish wildlife habitat, and improve water quality
*How it works*: Highly erodible cropland is targeted for enrollment in 10-15 year contracts. Landowners receive annual rental payments and cost share assistance (up to 50%) for the establishment of vegetation. USDA also provides technical assistance. Administered by the USDA Farm Service Agency (USDA Farm Service Agency 2003).

### Environmental Quality Incentives Program (EQIP)

*Purpose/Goal:* To optimize the environmental benefits of agricultural practices while ensuring the compatibility of production and environmental goals.
*How it works*: Priority environmental concerns and practices are determined at the state level and adjusted based on local conditions. Applications are ranked based on cost effectiveness and expected environmental benefits. Enrolling producers receive cost-share payments of up to 75% of the cost of the conservation practice, as well as technical assistance from USDA. Cost-share percentage may be up to 90% for limited resource farmers. Administered by the USDA Natural Resources Conservation Service (USDA Natural Resources Conservation Service 2005a).

### Wetlands Reserve Program (WRP)

*Purpose/Goal:* To restore and protect wetlands
*How it works:* The U.S. Congress determines the number of acres that can be enrolled and leaves spending somewhat flexible. Eligible land includes acreage that has been converted from a wetland into farmland, acreage that has become a wetland as a result of flooding, and other priority areas in which significant wildlife habitat benefits could be obtained. Land is enrolled in a permanent easement, a 30-year easement, or a restoration cost-share agreement. USDA provides technical assistance for all funded restoration activities. With a permanent easement, USDA pays for the easement and 100% of restoration costs. With a 30-year easement, USDA pays for the easement and up to 75% of restoration costs. With a restoration cost-share agreement, USDA pays up to 75% of restoration costs. Administered by the USDA Natural Resources Conservation Service (USDA Natural Resources Conservation Service 2005a).

### Wildlife Habitat Incentives Program (WHIP)

*Purpose/Goal:* To encourage the establishment of high quality wildlife habitat, especially for species in decline and for habitats identified as priorities by state and local partners

*How it works:* Land can be enrolled for 5, 10, or 15 years, with higher cost shares offered for 15 year agreements. USDA provides technical assistance and pays up to 75% of cost associated with the establishment or protection of wildlife habitat. Administered by the USDA Natural Resources Conservation Service (USDA Natural Resources Conservation Service 2005a).

# PART 5: CONCLUSION

The case studies discussed in Parts 3 and 4 suggest that sustainable natural resource management on private lands faces some significant obstacles. Of these, four are of particular importance.

First, there are problems with equity, both spatial and temporal. Spatially, actions by one landowner may have significant impacts on surrounding landowners, but, beyond nuisance law, there is little incentive for a landowner to consider these landscape level impacts. In the Deer Lodge area, it might be selling land to be developed, impacting the community in social and ecological ways. In the Dry Creek watershed, it might be hiring the lowest bidder to clear cut a forest with no provisions for best management practices.

In addition, there are no mechanisms to ensure equity across generations. The costs of today's actions are often borne by future generations, and though some governmental programs and regulations attempt to address this, they are insufficient. In Deer Lodge, harvesting practices by earlier generations have left a low-quality forest throughout the region. In Dry Creek, channelization and past tillage practices have contributed to the significant sedimentation problems that now exist. Mechanisms are needed to ensure that future generations do not have similar costs to bear.

Second, and associated with equity issues, there are significant problems with accountability. There are no rules within government and market institutions to hold private landowners accountable to one another or to society at large. This problem is partially due to the fact that it is difficult to attribute negative environmental impacts to a particular landowner or action. This is particularly

evident in the Dry Creek case, in which there are many sources and many sinks of sediment.

Third, there are problems with local governance and adaptability. Few rules regarding natural resource management are determined at the local level and little capacity exists to establish and enforce rules if provided with the opportunity. In both Deer Lodge and Dry Creek, there was little history of local residents working together and there were no mechanisms to encourage them to work together to address natural resource issues in their communities. Additionally, there are not clearly defined roles for government at any level in facilitating or empowering local institutional capacity related to natural resource management.

Finally, reductionism and the “expert” model of natural resource management are also problems. Resource management continues to be viewed as a technical task that is the responsibility of “expert” agency personnel. In reality, it is very much a social process that calls for the involvement and input of local citizens. This came out in interviews associated with both case studies. Landowners and other stakeholders viewed planning and implementation of natural resource management activities as “their” job, meaning agency employees. There was little discussion of the idea that “we” should be involved in these activities.

Though these, and other, obstacles to the sustainable management of natural resources on private lands exist, there is hope for the future. The

processes described in Part 2, and other possible ways to address these problems, should incorporate the following:

- The roles of agencies must shift away from that of "expert" decision makers to become sources of information and technical assistance and facilitators of local governance processes. Due to their positions of authority, whether perceived or real, agency personnel have a unique opportunity to initiate participatory rule-making processes (Rosa et al. 2003; Wondolleck and Yaffee 2000). Agencies must adapt to a shift away from reductionist-based management and find ways to encourage employees to assume the types of roles that accompany this shift. Agencies at the state and federal levels also need to pursue innovative alternatives to regulation (Daniels and Walker 2001; Holling and Meffe 1996; John 1994; Shutkin 2000). It should be noted that these are significant changes from the conventional "way of doing things" in most natural resource agencies and would require legislative change and support.
- Citizens must become more active in demanding a voice in the decisions that affect local natural resources and in carrying out management decisions. Participatory approaches to the governance of natural resources are limited by the willingness of local communities to participate (Durant et al. 2004; Fiorino 1996). Trust in government must be reestablished, and the salience of issues must be made clear (Putnam 1995).

- Relationships among community members must be nurtured to increase governance capacity and social learning. Currently, mechanisms by which local rules can be created to address natural resource issues do not exist in most communities. Additionally, there has been a widespread decline in community participation in the United States over the past few decades (Putnam 2000). By increasing social capacity and learning, citizens are more prepared to assume active roles in local rule-making (Holling and Meffe 1996; Webler and Renn 1995). This governance capacity must be supported by clearly defining roles for local, state, and federal governments in natural resource governance. In addition and due to the historical void of local institutional capacity, state and federal policy and agency conduct must support the development of local natural resource governance capabilities. With support from state and federal policy and the private sector, local governance of natural resources can be an important mechanism to build and maintain community vitality and prosperity through the sustainable use and management of natural resources.
- The relationships between people and nature must come to recognize natural systems and reflect the interdependency of social, economic, and environmental sustainability. This requires a shift away from the conventional anthropocentric and reductionist viewpoints towards a systems perspective that incorporates social and ecological systems and reflects the fact that humanity's social and economic well-being

are ultimately dependent upon the well-being of the environment (Folke et al. 2002; Holling et al. 2002). This entails a change in worldviews and values associated with the environment—changes that will not be easily accomplished. An example of such a change would be for society to gradually adopt a land ethic, such as that expressed by Aldo Leopold, and thereby form a very different connection to natural resources.

- The rules governing decision-making must encourage accountability and equity. There is a need for economic incentives to encourage conservation and cooperative management at a landscape scale on private lands. These incentives should reflect the value of ecosystem services provided by these lands (Bean et al. 2003; Holling and Meffe 1996; Wolff and Hirschhorn 2001). Effective relationships within communities can also lead to the development of cultural norms that serve as rules to address accountability and equity problems (Ostrom 1990; 1999).

In order for the processes described and advocated in this dissertation to be effectively employed to address natural resource issues on private lands in many different communities, there must be support from many different sources. Legislators at the state and federal level must introduce and pass legislation that offers alternatives to conventional natural resource management regimes. Programs are needed that offer incentives for cooperative management in privately owned landscapes. Legislators must establish a means by which

agencies and local communities can develop and adapt management practices that are locally relevant. These types of policies would represent major paradigm shifts and require a significant departure from the typical incremental way in which policy change occurs. The funding of pilot programs offers a means by which to build support for these types of policy approaches.

The civil sector, including non-governmental organizations (NGOs), can provide educational and incentive programs that encourage landowners to place value on environmental sustainability while also ensuring economic equity. NGOs can also lobby for better natural resource policies. By supporting these organizations, as well as through individual efforts, citizens can also help to facilitate change.

Researchers can continue to facilitate and study processes like those described in Part 2. There is a need for more case studies of and continued communication about these processes. While each situation and location presents different challenges, lessons learned from previous efforts can help guide facilitators. Additionally, the more people that become involved in these efforts, the greater the public's understanding of and demand for alternatives to conventional natural resource management.

Land grant universities and other educational institutions responsible for the academic training of natural resource professionals must structure their programs to reflect the fact that natural resource management is a social process. Technical training is needed, but programs should also incorporate skill development in collaboration, facilitation, and education. These types of skills are

needed if natural resource professionals are to effectively work with communities to address natural resource issues. Academic institutions have the opportunity to train resource professionals that can understand and address the social and technical aspects of natural resource problems.

Federal and state agencies have important roles to play in ensuring the sustainability of natural resource management on private lands. These agencies have the opportunity to develop innovative alternatives to environmental regulations and to partner with other agencies and stakeholder groups to enhance the likelihood that the many values associated with natural resources are recognized. There is also a need for agencies to adopt the paradigm of natural resource management as both a technical task and a social process. Changes within the agencies will require legislative support as well as the changes in academic training of professionals mentioned above.

Ultimately, to ensure the sustainability of natural resources on private lands, there need to be changes in two sets of relationships: 1) those among individuals involved in management across the landscape, including private landowners, stakeholders, and agency personnel; and 2) those between these individuals and nature.

An increase in trust and accountability in the first set of relationships would help to overcome many of the problems discussed. Additionally, a shift in the second set of relationships away from anthropocentric and reductionist views could result in changes in values associated with nature and in approaches to natural resource management, likely resulting in more equitable and sustainable

outcomes. Changes in each of these sets of relationships entail significant departures from current conditions and paradigms. These changes will not be easy but are needed if we, as a society, wish to ensure the sustainable management of natural resources on private lands.

**What about Joe?**

So what does all this mean for the landowner we met in the introduction? I'll let him tell you…

It's been about a year since I spoke with you last. I'm still hunting and fishing every chance I get, and those beavers are still causing problems. Some good things have happened though. About six months ago, this woman from the state sent me a letter saying that there was going to be some meeting about Dry Creek up at the town hall. I wasn't really sure what it was about, but they were providing a free dinner so I figured I'd check it out. My friend, Bill…remember him? The one with all the sand? Well, we went up to the meeting together. There weren't a whole lot of folks there…probably about 20 of us. I knew most of the people there, but I hadn't seen many of them for years. The others were new to the area.

The folks in charge started asking us about the creeks and forests and farmland around here, wanting to know what we liked about the area and what we were worried about. It was kind of nice to talk about that with my friends and neighbors. It's like we notice all these changes but can't really make sense of it

on our own, but when we hear what other people have seen at their place, it starts to make more sense.

At the end of the meeting, they told us that they wanted to try to do something about the sand and erosion…that they even had some money to do it, but they wanted local people to help. I was more than a little suspicious about all this. After all, I didn't have much reason to trust these folks from the state after they brought those beavers in. Bill was really interested, you know, because of the sand killing his trees. He's willing to do about anything to stop it. So, we agreed to meet again, along with about 10 others.

We started getting together every couple of weeks with people from the state environmental agency, extension, soil conservation, and a non-profit group. At first I didn't really participate in the meetings, but after going along with Bill a few times, I started to realize that these folks were really interested in having us be a part of the decisions. Since I started really participating, I've learned a lot about where they think the sand is coming from and what they'd like to do to stop it, and I think that they've learned a lot about the people around here and what we value.

We local folks have taken the lead in talking with people whose property is either a source of the sand or a sink for it. These folks seem to be pretty willing to try to do something about it when they're asked by someone local, especially someone like Bill who can really talk about how it's hurt him. We've already started working on some of the gullies that I told you about before—I was right, a lot of the sand does come from those. We've also found some places in the

creek to put these structures that help to hold the banks and bed in place. We're talking about trying to get the creek entirely back in its old bed, instead of the channel they dug, but that's going to take a lot of effort, coordination, and money.

Bill hasn't really noticed a change yet in the amount of sand ending up in his trees, and I haven't noticed a change in the Hatchie, but I'm convinced that what we're doing is helping. I'm glad that someone made the effort to involve us in this work. After all, this is our home, and we care about what's happening here. I know it's gone a lot better than the organizers had ever hoped—mainly because of the work of the local folks in talking with the landowners and farmers. Now the local folks outnumber the others at our meetings, and a few of us have really taken leadership roles.

Besides the potential environmental outcomes, this effort has helped to reconnect me with my community. I told you before that I didn't really see my neighbors very often. Now they stop by whenever I'm outside to see what's going on with the project. I know they're just being nosy, but at least we're talking more. I think it has also helped me to get to know some of the newer folks that have moved in from Memphis or Jackson. Most of them are country folks deep down, just like me, and I've enjoyed getting to know them.

I just wish they had done this a long time ago, before things got so bad. I do feel that there's hope now…that Bill might not lose too many more trees, that my forestland won't be so swampy, and that my great grandkids might be able to enjoy fishing on the Hatchie. I think each person that's been involved in this has their own reason for sticking with it. For some it's financial, for some it's

environmental, but for me it's ethical. I want my great grandkids to be able to enjoy all the natural beauty that I've experienced in my life and this is my little way of making sure that happens.

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# APPENDIX A. HUMAN SUBJECTS RESEARCH CONSENT FORMS UTILIZED FOR KEY INFORMANT, FOCUS GROUP, AND INDIVIDUAL INTERVIEWS

**Consent Form**
**Key Informant Interviews of the Emory-Obed Watershed of Tennessee.**

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You are invited to participate in a research project whose purpose is to gain a better understanding of forest issues and activities in the Emory-Obed watershed region. The study also seeks information about communities in the watershed and their relation to area forests.

You are being asked to engage in the following activity: Respond to structured questions to elicit information regarding forests, forest land use and community characteristics in the Emory-Obed region.

The interview will be recorded through field notes and is anticipated to take no more than one hour.

Any and all information you provide will be kept in confidence. Neither your name nor any identifying information will be used in any reports, although your words may be used to support the interpretation and analysis. At no time will your words be linked or traceable to you.

You are being asked to voluntarily participate and you are free to withdraw from participation at any time. If you choose to terminate your participation in the study after the interview is held, please do so by notifying the principal investigator as designated below and your interview form will be destroyed.

You may affirm your agreement to participate in this research study by signing below.

Signature_____Date_____

Questions or comments regarding this invitation may be directed to:

David Ostermeier
The University of Tennessee
Department of Forestry, Wildlife, and Fisheries
274 Ellington Hall
Knoxville, TN 37876
Phone: 865-974-8843
Fax: 865-974-4714

## Consent Form
## Focus Groups with Private Forest Landowners, Natural Resource Professionals, and Forest Stakeholders in Morgan County, Tennessee

You are invited to participate in a research project. The purpose of this study is to gain information about the forest-related concerns and activities of private landowners, forest stakeholders, and natural resource professionals in Morgan County, Tennessee. As a private landowner, a forest stakeholder, or a natural resource professional in Morgan County, you are being asked to answer a series of questions based on your personal experiences. The information gathered in these focus groups will be used to help us initiate collaborative working groups to strengthen forest stewardship in the local area.

Under no circumstances will any concealment or deception be used in this research. On the contrary, the researcher's approach to focus groups is to create an open forum for discussion that is non-threatening and non-manipulative.

Confidentiality of all focus group participants will be maintained to the best of our ability, but cannot be guaranteed due to the nature of the focus group setting. The session is being tape recorded to ensure accuracy in writing reports. Your name will not be linked with specific responses in any way. If the tapes are transcribed, your name will not be included in the written transcript. Copies of notes and transcripts will be shared only with research team members for analysis purposes. All members of the research team will be asked to sign letters of confidentiality. If transcribed, the original tapes will be destroyed immediately following transcription. If not transcribed, the original tapes will be stored for three years after completion of the study and then destroyed. No incentives are offered to you for your time and effort in participating; however, you may personally benefit by thinking and talking with the research team and other focus group members about your forests or the forests in your community.

Your signed consent form will be retained for three years after completion of the study and then destroyed. If you feel uncomfortable during the session, you may discontinue your participation by notifying the moderator and exiting the room. If you choose to discontinue your participation at a later date, notify the principal investigator below and, to the best of our ability, your comments will be excluded from all transcripts and reports. You are free to choose not to participate in this study.

Neither your name nor any identifying information will be used in any reports, although your words may be used to support the interpretation and analysis. At no time will your words be linked or traceable to you.

You may affirm your agreement to voluntarily participate in this research study by signing below.

Signature_____ Date_____

Questions or comments regarding this invitation may be directed to:

Jamey Pavey
The University of Tennessee
Department of Forestry, Wildlife & Fisheries
274 Ellington Hall
Knoxville, TN 37996
Phone: 865-974-1963
Fax: 865-974-4714
jpavey@utk.edu

**Consent Form**
**Key Informant Interviews of the Hatchie Watershed of Tennessee.**

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You are invited to participate in a research project whose purpose is to gain a better understanding of forest issues and activities in the Hatchie watershed region. The study also seeks information about communities in the watershed and their relation to area forests.

You are being asked to engage in the following activity: Respond to structured questions to elicit information regarding forests, forest land use and community characteristics in the Hatchie region.

The interview will be recorded through field notes and is anticipated to take no more than two hours.

Any and all information you provide will be kept in confidence. Neither your name nor any identifying information will be used in any reports, although your words may be used to support the interpretation and analysis. At no time will your words be linked or traceable to you.

You are being asked to voluntarily participate and you are free to withdraw from participation at any time. If you choose to terminate your participation in the study after the interview is held, please do so by notifying the principal investigator as designated below and your interview form will be destroyed.

You may affirm your agreement to participate in this research study by signing below.

Signature_____
Date_____

Questions or comments regarding this invitation may be directed to:

Jamey Pavey or Leslie Horner
The University of Tennessee
Department of Forestry, Wildlife & Fisheries
7A Morgan Hall
Knoxville, TN 37996
Phone: 865-974-1963 or 865-974-1955
Fax: 865-974-4714

## Consent Form: Focus Groups with Private Forest and Agricultural Landowners and other community members in Hardeman, Haywood, and Madison Counties, Tennessee

You are invited to participate in a research project. The purpose of this study is to gain information about the natural resources-related values, concerns, activities of, and potential for collaboration among private landowners and other community members in Hardeman, Haywood, and Madison Counties. As a private landowner or a resident of a community within the Hatchie River watershed, you are being asked to answer a series of questions based on your personal experiences. The information gathered in these focus groups will be used to help us initiate collaborative working groups to strengthen stewardship of natural resources in the local area.

Under no circumstances will any concealment or deception be used in this research. On the contrary, the researcher's approach to focus groups is to create an open forum for discussion that is non-threatening and non-manipulative.

Confidentiality of all focus group participants will be maintained to the best of our ability, but cannot be guaranteed due to the nature of the focus group setting. The session is being tape recorded to ensure accuracy in writing reports. Your name will not be linked with specific responses in any way. If the tapes are transcribed, your name will not be included in the written transcript. Copies of notes and transcripts will be shared only with research team members for analysis purposes. All members of the research team will be asked to sign letters of confidentiality. If transcribed, the original tapes will be destroyed immediately following transcription. If not transcribed, the original tapes will be stored for three years after completion of the study and then destroyed. No incentives are offered to you for your time and effort in participating; however, you may personally benefit by thinking and talking with the research team and other focus group members about your forests or the forests in your community.

Your signed consent form will be retained for three years after completion of the study and then destroyed. If you feel uncomfortable during the session, you may discontinue your participation by notifying the moderator and exiting the room. If you choose to discontinue your participation at a later date, notify the principal investigator below and, to the best of our ability, your comments will be excluded from all transcripts and reports. You are free to choose not to participate in this study.

Neither your name nor any identifying information will be used in any reports, although your words may be used to support the interpretation and analysis. At no time will your words be linked or traceable to you.

You may affirm your agreement to voluntarily participate in this research study by signing below.

Signature_____ Date_____

Questions or comments regarding this invitation may be directed to:

Leslie Horner
The University of Tennessee
Department of Forestry, Wildlife & Fisheries
274 Ellington Hall
Knoxville, TN 37996
Phone: 865-974-1955
Fax: 865-974-4714
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Jamey Pavey
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Department of Forestry, Wildlife & Fisheries
274 Ellington Hall
Knoxville, TN 37996
Phone: 865-974-1963
Fax: 865-974-4714
jpavey@utk.edu

**Consent Form**
**Interviews in the Hatchie Watershed of Tennessee.**

---

You are invited to participate in a research project whose purpose is to gain a better understanding of forest issues and activities in the Hatchie watershed region. The study also seeks information about communities in the watershed and their relation to area forests.

You are being asked to engage in the following activity: Respond to structured questions to elicit information regarding community characteristics, land use, and decision-making in the Hatchie region.

The interview is being tape recorded to ensure accuracy in writing reports. Your name will not be linked with specific responses in any way. When the tapes are transcribed, your name will not be included in the written transcript. Copies of notes and transcripts will be shared only with research team members for analysis purposes. All members of the research team will be asked to sign letters of confidentiality. The original tapes will be destroyed immediately following transcription. No incentives are offered to you for your time and effort in participating.

Your signed consent form will be retained for three years after completion of the study and then destroyed. If you feel uncomfortable during the session, you may discontinue your participation by notifying the interviewer. If you choose to terminate your participation in the study after the interview is held, please do so by notifying the principal investigator as designated below and the tape and transcription of your interview will be destroyed.

Neither your name nor any identifying information will be used in any reports, although your words may be used to support the interpretation and analysis. At no time will your words be linked or traceable to you.

You may affirm your agreement to voluntarily participate in this research study by signing below

Signature_____ Date_____

Questions or comments regarding this invitation may be directed to:

Jamey Pavey
The University of Tennessee
Department of Forestry, Wildlife & Fisheries
274 Ellington Hall
Knoxville, TN 37996
Phone: 865-974-1963
Fax: 865-974-4714

# APPENDIX B: INTERVIEW PROTOCOL AND FOCUS GROUP MODERATOR'S GUIDE FOR PART 3

UT IFAFS Key Informant Protocol

Date: Time: Place (city and county):

Name: Phone:

Title: Length of time in position or connected to watershed:

Interviewers:

For the purposes of this interview, the term “community” will be used to describe a group of people living in the same locality and under the same government or an unincorporated town with no governmental structure but identifying themselves as a community. Our first question deals with the history of land use in the region.

1. Describe any specific events or trends that stand out to you about historical land use patterns in the Emory/Obed watershed.

    a. Were the impacts different across the watershed? How were they different?

    b. What were the impacts on forests in particular?

The next several questions focus on the current status of land use in the area and on initiatives involving private forestland management.

2. What are some important current issues, trends, or concerns regarding forests and forestland use in the watershed?

    a. Which of these are the most important?

    b. For which areas in the watershed are these events most important? (Are there particular communities that come to mind?)

3. In the present and recent past, have there been any significant actions in the watershed involving private forestland management (by local government, non-profit organizations, citizen groups, or government agencies)?

4. Describe these initiatives

    a. What prompted the initiative/action?
    b. Who was involved and what roles did they play?
    c. Where did the activity take place or was it county/watershed-wide?
    d. When did it begin or occur? (Is it ongoing? If so, what are expectations for its future?)
    e. How inclusive has community involvement been in these activities?
    f. When did it happen?
    g. What were the outcomes?
    h. Which of these initiatives were the most important?

The next few questions address relationships among community members.

5. Are there social or cultural distinctions between people living in the watershed? If so, describe these distinctions among community members?

    a. Tell me about the interactions between different segments of the population? (How extensive? How good? Contentious?)

    b. What communities are affected most by these distinctions?

    c. What communities are affected least?

6. Tell me about trust in the area. (Trust among community members? Trust of local government? Trust of local politics? Trust for state or federal agencies?)

    a. Where is trust lacking?

    b. Where is trust strongest?

7. Do you feel that communities are capable and equipped to tackle the forest-related issues you mentioned earlier? Why or why not?

    a. How willing do you think landowners are to work together and/or with other community members to tackle these issues? Why or why not?

    b. Do these capacities differ across the watershed?

c. Where would you say they are highest? Lowest?

The final questions address your perceptions about the communities' hopes and fears about the future of the area's forests and their connection to the forests.

8. What do you perceive to be the prominent vision or primary hopes that people in the area have about the future of the watershed and its forests?

    a. Which communities most demonstrate a commitment to realizing these hopes?

9. What do you perceive to be some of the fears that people in the area have about the future of the watershed and its forests?

    a. In what communities are these felt most strongly?

10. Are there any communities that stand out as being very connected to the area's forests?

11. Can you think of anyone else in the Emory-Obed watershed that we should talk to regarding these issues and concerns?

Moderator Guide for Focus Groups in Morgan County

Preamble

Thank you very much for agreeing to participate in this focus group discussion. I'm _____, a graduate student at the University of Tennessee. I'll be your moderator for this session. My colleague, _____, will be assisting and taking notes on the discussion.

Each of you has been selected because of your interest in the forests and natural resources of Morgan County. We are also conducting focus groups with others, including private forest landowners and natural resource professionals. The information gathered in these focus groups will be used to help us initiate collaborative working groups to build community around natural resources and to strengthen forest stewardship in the local area. We will cover four major topics this morning, and it is estimated that the session will last approximately an hour and a half.

In a group interview like this it is really important that you express yourself openly. There are no right or wrong answers. We want to know what YOU think. We are tape-recording the session to ensure accuracy in writing up our report. However, your responses will not be linked with your name in any way. Everything you say will be confidential.

Because we are taping the discussion, I may remind you occasionally to speak up and to talk one at a time so that I can hear you clearly when I review the session tapes. My role as guide is to help the interaction to flow among you. Let's have lots of discussion and dialogue.

Each time I ask a question, there is no need for everyone around the table to respond. However, it is important that a full range of ideas is expressed. If you would like to add to an idea or if you have an idea that contrasts with those that have been aired, that's the time to jump into the conversation. We don't have to go in a circle. There is no such thing as "your turn". It's always your turn. Let us know if there is anything we can do to make you more comfortable. Our goal is to foster a trusting environment in which you are able to speak freely. We would ask that what is said in this room does not get passed around haphazardly. You may want to discuss this further with your organization or each other at a later time, and we will leave that to your discretion.

Again, we are very pleased that you have taken the time to share your thoughts about forests and natural resources in Morgan County.

"Ice-breaker" Question(s): Please introduce yourself with first name only and tell us about when you first became interested in the natural resources and forests of Morgan County.

1. What concerns do you have about the present status and future stewardship of forestland in Morgan County? *If don't get much feedback, ask:* What about natural resources in general?
2. For you, which of these concerns are the most critical?

3. What challenges do you face in working to influence the management of forests and other natural resources in Morgan County?
4. What are your hopes regarding the future of Morgan County's forests? Please take a minute or two to think about this, and then write down a couple of thoughts. After everyone is finished, I'll ask you to share these hopes with the group. *List on flip chart.*
5. Brainstorming: We've covered a lot of ground today, talking about your concerns and hopes related to Morgan County's forests, as well as your experiences as a stakeholder in the area. At this point, I would like you to expand your thinking about this last question. Start by looking over the hopes that have been listed on the pages. I would like for you to think about ways to encourage private forest landowners in Morgan County to engage in practices that would lead toward the realization of the hopes that you collectively outlined.
    a. Please take a few minutes to think about this and then write down two or three ideas that would help private landowners to work toward these hopes. Please try to keep in mind the present situation and perspective of landowners in Morgan County. When finished, we will share these on the flip charts. *Allow several minutes, then record ideas on an easel pad and number.*
    b. Now, from these ideas, each of you please indicate which one stands out to you as having the most potential to be successful in Morgan County. *Mark with hash marks on the pad or give them dots to mark*
    c. What role do you feel stakeholders can or should play in implementing ideas like these?
    d. Take home question to ponder: What role do you feel you or your organization could specifically play in implementing these ideas?

Closure: Thank you so much for taking time out of your busy schedule to participate in our discussion today. Your input will be very helpful as we move forward with our project
Is there anything we've left out that you'd like to add? Other concerns or ideas related to our topics?

# APPENDIX C: INTERVIEW PROTOCOLS AND FOCUS GROUP MODERATOR'S GUIDE FOR PART 4

*HATCHIE RIVER WATERSHED*
Key Informant Protocol

Date _____ Time _____

Place (city and county) _____

Name _____ Phone _____

Title _____

Tributary most familiar with _____

Length of time in position/ connected to watershed _____

Interviewers _____

1) How do residents of the _____ Creek watershed(s) define where they live? (i.e. Is there a single town they identify with?) Are there other distinctions within the community? (Do people identify or classify themselves in other ways?)

2) What do residents of the community feel is important or special about the community? (not just NR-related)

3) Describe a time (or times) at which people in this community [or watershed] have worked together to accomplish a common goal.

    a. What prompted the initiative/action?

    b. Who was involved and what roles did they play? Did local government play a role?

    c. Were there any changes in how people interacted with each other?

    d. Did people feel like the joint effort was successful?

e. [Prompt: If not already expressed, ask about resource-related efforts.]

4) Based on your experiences in the community / watershed, tell us about the relationships between the following (in general), including how much trust is present:

   a. Landowners and other landowners

   b. Landowners and resource agency personnel officials (Does it differ between agencies?)

   c. Landowners and government generally (differences between levels? Federal/State/Local)

   d. Landowners to the larger community, including other stakeholders (such as environmental groups, recreation interests, etc.)

      i. Are there strong bonds between certain groups/individuals?

      ii. Are there tensions between certain groups/individuals?

5) Describe current land use patterns in the watershed. Have there been any significant changes in land use patterns in the recent past (5-10 years)? To what do you attribute these changes?

   a. Describe any specific events or trends that stand out to you about historical land use patterns in the watershed.

6) What about ownership patterns? How have these changed in the past 5-10 years? To what do you attribute these changes?

7) When people make decisions regarding their land and how they use it, how much do you think each of the following has influence: (Significant influence, Some influence, Little influence, No influence, Not sure)

a. Gov't. policies or regulations *Sig Some Little No NS*
b. Money or market incentives *Sig Some Little No NS*
c. Family traditions and history *Sig Some Little No NS*
d. Stewardship values *Sig Some Little No NS*
e. How it may impact the community / neighbors *Sig Some Little No NS*
f. Cultural norms *Sig Some Little No NS*

8) In your opinion, do landowners in the community have a good understanding of how different land uses and management practices affect the ecology of the Hatchie River system?

9) What are some important current issues, trends, or concerns regarding natural resources in the community?

a. Describe any other concerns people currently have, whether related to natural resources or not. (Economic, social, etc.)

10) Let's talk about participation in incentive programs for natural resource management.
a. Briefly describe the programs that are available through your agency.

b. Describe any trends you've noticed in terms of funding for the programs and enrollment or interest in them over the last 5-10 years.

What government-sponsored incentive programs have you heard of and have you or anyone you know participated in any?

c. In terms of developing good land stewardship, what are some successes of these programs? Some shortcomings?

d. Do you have any general suggestions for ways the programs can be improved? (outreach, types of incentives, quality of interactions, etc.)
(Pretend that you're not limited by resources, bureaucracy, etc.…)

11) Are you aware of any financial incentives available from private companies or non-governmental organizations to private landowners? (e.g. seedling programs by timber industry, recreational uses such as hunting)

Have these incentives influenced land management in the area?

Have there been any unintended outcomes?

12) Do you feel the current property tax structure influences stewardship of natural resources? Why or why not?

a. How could it be improved to better promote stewardship?

13) Between Piney Creek, Richland Creek, and Clover/Dry Creeks, which do you think has the most potential for a successful ecological restoration based on collaboration?

a. Why did you rank them in that order?

b. In your opinion, what types of barriers would be faced in that effort? Would they be the same or different in other tributaries of the Hatchie?

c. Who do you think should be included in such an effort? (in general, and specific people, if you think of any)

d. Can you think of any particular groups of people or individuals who should be approached with extra sensitivity or who might be hard to involve in a restoration effort?

e. What advice would you have for someone trying to initiate a collaborative restoration project, or what characteristics do you think would need to be present in such an effort?

14) What do you perceive to be the prominent vision or primary hopes that people in the area have about the future of the watershed and its natural resources?

15) What do you perceive to be some of the fears that people in the area have about the future of the watershed and its natural resources?

16) Given what we've discussed today, can you think of anyone else in the watershed that we should talk with about these topics?

Focus Group Moderator's Guide

Thank you very much for agreeing to participate in this discussion. I'm Jamey Pavey, a graduate student at the University of Tennessee. I'll be your moderator for this session. My colleague, _____, will be assisting and taking notes on the discussion.

Each of you has been asked to attend because you own property in the Clover/Dry Creek watershed. We are also conducting focus groups with others, including other landowners and general community members. The information gathered in these focus groups will be used to help us better understand the values local residents place on the natural resources of the local area and to assist in the planning of future activities.

In a group interview like this it is really important to us that you express yourself openly. There are no right or wrong answers. We want to know what YOU think. We are tape-recording the session to ensure accuracy in writing up our report. However, your responses will not be linked with your name in any way. Everything you say will be confidential.

Because we are taping, I may remind you occasionally to speak up and to talk one at a time so that I can hear you clearly when I review the session tapes. My job as guide is to help the interaction to flow among you. Let's have lots of discussion and dialogue.

Each time I ask a question, there is no need for everyone around the table to respond. However, it is important that a full range of ideas is expressed. If you would like to add to an idea or if you have an idea that contrasts with those that have been aired, that's the time to jump into the conversation. We don't have to go in a circle. There is no such thing as "your turn." It's always your turn.

Again, we are very pleased that you have taken the time to share your thoughts about natural resources and quality of life in the Clover/Dry Creek watershed.

Icebreaker: Tell us your name and how long you've lived/owned land in this area.

1. What comes to mind when you think of the Hatchie River?
2. What are other natural resources in the area that are important to you and what makes them important?
3. What is your biggest concern about these resources?
4. What kinds of changes have you seen in the Hatchie River or in the creeks? Have you noticed anything on your own property or on your neighbors' property? How long have these changes been occurring?
5. Why do you think these changes are occurring?
6. What are the impacts of these changes, both present and in the future?
    a. Ecologically
    b. Impact way of life

7. What have people done to address these changes? (Gov't programs, On own, Other) Do you think these have been very effective? What, if anything do you think needs to be done?
8. If there were an effort to initiate a cooperative project to address some of the problems of the Hatchie River and Clover/Dry Creek, what would be your reaction? Under what conditions would you be willing to participate? What kind of leadership would be needed? What should the focus of the project be? What kinds of incentives/practices would be needed?

Closing question: Thank you so much for taking time out of your busy schedule to participate in our discussion today. Your input will be very helpful as we move forward with our project. Is there anything we've left out that you'd like to add? Other concerns or ideas related to our topics?

Interview Protocol for landowners, farmers, hunters, community residents

Date_____ Time_____

Name_____

County_____

1. Background questions:
    a. What is the primary use of your land? (i.e. row crops, timber, wildlife habitat)

    b. How long have you lived/owned land/farmed/hunted in this area?

    c. How many acres do you own/farm/hunt on?

    d. Landowners and farmers: What percent of your income do you earn from the land? Has this changed over time?

2. Tell me a little bit about the community (communities) in this area.
    a. Where do people work? What is done in free time? Do you feel like you know most of your neighbors?

    b. Have there been any major changes in the community in the time that you've lived here (major changes with regard to population, economic activity, etc., as the result of war, drought, market price changes, development projects, changes of jurisdiction, etc.)? What do you think caused/stimulated these changes?

    c. How has farm life, the local farm economy, and land use changed?

3. I'd like to know a little more about your contact with other landowners/farmers/hunters…How often do you talk with other landowners/farmers/hunters about common interests like farming, land use, the community, hunting, etc.?

    a. Where does this usually happen?

    b. What kinds of things do you talk about?

c. Describe the value to you of these discussions.

d. Would you like to do this more? Why or why not?

4. Has the farming/hunting/local community recently faced any issues or changes that have been contentious? If yes, describe the nature of the conflict. Has this conflict been disruptive to those who live or work in the area? How so?

5. Describe your interactions with other groups (if a landowner, interactions with hunters or local community residents, etc.). Note: Cover positive and negative interactions.

6. What do you see as the most serious problems that you and other landowners/farmers/hunters/etc. are facing during the next five years? Prompt: If needed, specifically ask about problems related to natural resources/farming/land use.

7. What do you see as the greatest opportunity that you and other landowners/farmers/hunters/etc. are facing during the next five years? Prompt: If needed, specifically ask about opportunities related to natural resources/farming/land use.

8. In your understanding, who is responsible for making rules or regulations about land use in this area? How do you feel about current policies related to land use? Are there any practices that you are concerned about?

9. How do you express your concerns or desires about the natural resources of the area to those who make the rules or have influence?

10. Do you view the natural resources (ag land, streams, rivers, forests, etc.) of the area as an economic resource? Do you view the natural resources of the area as being sacred or special in some way? How do these views affect your practices?

11. Have you done anything to conserve or enhance the natural resources on your land?

12. How would you describe the condition of the natural resources in this area? What made you describe it in this way?

13. Do you have price support contracts or guaranteed purchase agreements for the selling of your crops? If yes, describe the type of contract agreement used.

14. Think of the last time you made a major decision about your land and how it is used. (examples: take a field out of production, try a new crop, dig a ditch, plant trees)
    a. What were the different options you considered?

    b. What factors did you take into account as you made your choice and how did you weigh these factors (costs and benefits)?

        i. Are there rules and regulations that you had to consider? If so, what are these rules and who makes these rules?

        ii. Do cultural norms (what others think you should or shouldn't be doing) factor into your decision making?

    c. What types of information did you look for when making this decision? Were you able to easily find this information? Was there information that you looked for, but didn't find?

    d. Did you consult anyone else? If so, whom? Why did you feel it was important to talk with them?

    e. Did you consider the impacts this decision might have on your neighbors?

f. Did you consider the impacts this decision might have on the environment?

15. Is there a creek on your property? If so, have you seen any changes in the creek over the time you've owned the land? What has happened? Why do think these changes have occurred?

16. Are there other folks that we should be sure to talk to about these topics? Specific farmers, landowners, hunting groups, etc.??

Interview Protocol—County Council Members

Date_____ Time_____

Name_____

County_____

1. How long have you lived in this area?

2. Do you own land in this area? If so, how much, and what is it used for?

3. How long have you served on the county council?

4. What motivated you to run for the office?

5. Tell me a little bit about the community (communities) in this area.

    a. Where do people work? What is done in free time? Do you feel like you know most of your neighbors?

    b. Have there been any major changes in the community in the time that you've lived here (major changes with regard to population, economic activity, etc., as the result of war, drought, market price changes, development projects, changes of jurisdiction, etc.)? What do you think caused/stimulated these changes?

c. How have farm life, the local farm economy, and land use changed?

6. Has the local community recently faced any issues or changes that have been contentious? If yes, describe what happened. Has this conflict been disruptive to those who live or work in the area? How so?

7. Describe your interactions with landowners/farmers/hunters/other community members. Note: Cover positive and negative interactions.

8. What do you see as the most serious problems that the local community is facing during the next five years? Prompt: If needed, specifically ask about problems related to natural resources/farming/land use.

9. What do you see as the greatest opportunity that the local community is facing during the next five years? Prompt: If needed, specifically ask about opportunities related to natural resources/farming/land use.

10. Are there rules or regulations about land use in this area? If so, who is responsible for making rules or regulations about land use in this area? How do you feel about current policies related to land use?

11. In your knowledge, do harvesting, processing, or selling rules exist that affect the harvesting level of any crops? If yes, please describe.

12. How would you describe the condition of the natural resources in this area? What made you describe it in this way?

13. Are there any forestry or agricultural practices used locally that you are concerned about?

14. Do you view the natural resources (ag land, streams, rivers, forests, etc.) of the area as an economic resource? Do you view the natural resources of the area as being sacred or special in some way? Do these views affect your voting?

15. Are there or have there been any recent major policy shifts or changes in government programs that affect land use in the area? If yes, please describe, including intended/potential outcomes.

16. Are you aware of any policies pending that may impact the relationships between landowners and/or farmers and government agencies? (Positive? Negative? Please describe)

17. Is there much coordination between local government and the agencies associated with agriculture/natural resources in this area? What about other groups (forestry association, non-profit groups, etc.)? If yes, describe.

18. Does the county council in this county have much of an impact on land use policy in the county? If yes, describe. If no, what body is responsible for regulating land use?

19. Are you aware of any incentives for landowners to work together to address natural resource problems?

20. Are there other folks that we should be sure to talk to regarding land use in this area? Specific farmers, landowners, hunting groups, etc.??

Interview Protocol for Agency Employees, Farm Bureau, NGOs

Date_____ Time_____

Name_____

Agency/Organization_____

1. How long have you lived in this area? Worked in this area?

2. Tell me a little bit about the community (communities) in this area.
    a. Where do people work? What is done in free time? Do you feel like you know most of your neighbors?

    b. Have there been any major changes in the community in the time that you've lived here (major changes with regard to population, economic activity, etc., as the result of war, drought, market price changes, development projects, changes of jurisdiction, etc.)? What do you think caused/stimulated these changes?

    c. How has farm life, the local farm economy, and land use changed?

3. Has the local community recently faced any issues or changes that have been contentious? If yes, describe the nature of the conflict. Has this conflict been disruptive to those who live or work in the area? How so?

4. Describe your interactions with landowners/farmers/hunters/other community members. Note: Cover positive and negative interactions.

5. What do you see as the most serious problems that the local community is facing during the next five years? Prompt: If needed, specifically ask about problems related to natural resources/farming/land use.

6. What do you see as the greatest opportunity that the local community is facing during the next five years? Prompt: If needed, specifically ask about opportunities related to natural resources/farming/land use.

7. Are you aware of rules or regulations regarding land use in this area? If so, who is responsible for making rules or regulations about land use in this area? How do you feel about current policies related to land use?

8. Does your agency have any responsibilities to govern or regulate land use? If yes, describe.

9. To your knowledge, do harvesting, processing, or selling rules exist that affect the harvesting level of any crops?

10. How would you describe the condition of the natural resources in this area? What made you describe it in this way?

11. Are there any forestry or agricultural practices used locally that you are concerned about?

12. How aware do you think landowners, farmers, etc. are of the natural resource problems in the area?

13. Do you view the natural resources (ag land, streams, rivers, forests, etc.) of the area as an economic resource? Do you view the natural resources of the area as being sacred or special in some way? How do these views affect the way you approach your job?

14. Are there or have there been any recent major policy shifts or changes in government programs that affect land use in the area? If yes, please describe, including intended/potential outcomes.

15. Are there any policies or government programs pending that may impact the relationships between landowners and/or farmers and government agencies? (Positive? Negative? Please describe)

16. Does your organization/agency provide information to landowners, farmers, hunters, other residents on a regular basis? What types of information? How is it distributed? Do you feel that anyone who wanted to find this information could? Do you feel that the information your organization/agency provides is accurate and sufficient to meet the needs? What about other organizations?

17. Is there any coordination among the different agencies associated with agriculture/natural resources in this area? Coordination with local government? What about other groups (forestry association, non-profit groups, etc.)? If yes, describe.

18. How do the organizations/agencies associated with agriculture and natural resources generally relate to each other?

19. Are you aware of any conflicts between organizational policies and what landowners or farmers would like in terms of assistance or regulations?

20. What types of technologies do farmers use? Precision farming, GIS, GPS, etc.? Have area farmers implemented new technology within the last five years? If yes, state the approximate year of change, what the reason was for the change, and give a brief description of the change.

21. Are you aware of any incentives for landowners to work together to address natural resource problems?

22. How often do you think landowners discuss natural resource related issues or problems? Where do you think this tends to occur?

23. Are there other folks that we should be sure to talk to regarding land use in this area? Specific farmers, landowners, hunting groups, etc.??

# APPENDIX D. FOCUS GROUP INVITATION LETTER FOR PART 4

June 8, 2004

Dear

I'm writing to invite you to get together with some of your neighbors to talk about the land and community life in the Clover/Dry Creek area. This is an opportunity for you to share a meal (provided) with others in the community, voice your thoughts and concerns about Clover/Dry Creek's natural resources, and better understand your neighbors' views. By participating, you will be helping a University of Tennessee research effort to develop an understanding of the Clover/Dry Creek area from the view of local landowners and residents.

There are three main purposes for the discussion:

- to get an idea of what kinds of changes you've seen in the land around where you live
- to learn about some of the concerns you and others living in the area have about the land and your way of life
- to explore potential opportunities to address the concerns that you have in common with your neighbors

Regardless of your occupation, whether you're retired or not, or how long you've lived or owned land in the Clover/Dry Creek area, your observations and input are important to this discussion. I hope it might also be something that you will enjoy—a new opportunity to talk with your neighbors about old times and new issues in your community. Also, a representative from the Hatchie River Partnership will join us after our discussion to briefly chat about some of the Partnership's stream restoration efforts.

The meeting will be held on **June 21** and will begin at **6pm**. It will be held at the **Toone City Hall** (2005 Hwy. 138). **We will provide you with dinner**, and you should plan on staying about 2 hours. I'll be in touch with you by phone in the near future to answer any questions you might have. In the meantime, please feel free to call me if you have any questions. You can reach me during the day at 865-974-1963 or in the evening at 865-908-7740. I look forward to meeting you and talking with you!

Best regards,

Jamey Pavey
Graduate Research Assistant
University of Tennessee
Department of Forestry, Wildlife, & Fisheries

# VITA

Jamey L. Pavey was born in Shelbyville, Indiana, on February 10, 1976. She was raised on a farm outside of Shelbyville and graduated from Rushville Consolidated High School in 1994. She then attended the University of South Carolina, majoring in Marine Science. She graduated *magna cum laude* and with honors from the South Carolina Honors College in May 1998. She spent one semester of her junior year studying at Deakin University in Warrnambool, Australia.

Following graduation, she returned to Indiana and worked for an environmental testing laboratory in Indianapolis for one year before accepting a position as a laboratory assistant at Ball State University. She held this position in the Chemistry Department for two years.

In 2001, she began graduate school at the University of Tennessee, initially pursuing a masters degree in forestry, but later changing programs to pursue a doctorate in natural resources. She held a graduate research assistantship funded by a USDA Initiative for Future Agricultural and Food Systems grant. She was granted her doctorate in 2005.

After graduation, Jamey and her husband, Jason, are planning to spend a summer working at a state park in Alaska. In August 2005, she will assume a position as an Assistant Professor in the Environmental Science Program at Lynchburg College in Lynchburg, Virginia.