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Bridges and barriers to ecosystem-based approaches : the case of Tennessee Valley Authority's adoption of the watershed approach

Brent K. Marshall

To the Graduate Council:

I am submitting herewith a dissertation written by Brent K. Marshall entitled "Bridges and barriers to ecosystem-based approaches : the case of Tennessee Valley Authority's adoption of the watershed approach." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Sociology.

Robert E. Jones, Major Professor

We have read this dissertation and recommend its acceptance:

David Feldman, Sherry Cable, Donald Hastings

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

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

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BRIDGES AND BARRIERS TO ECOSYSTEM-BASED APPROACHES: THE CASE OF TENNESSEE VALLEY AUTHORITY'S ADOPTION OF THE WATERSHED APPROACH

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

Brent K. Marshall
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DEDICATION

This dissertation is dedicated to my father, Edward Joseph Marshall.

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ABSTRACT

Natural resource agencies are advocating a form of citizen participation in which citizens mobilize proactively in a long-term, collective effort to protect the local environment and prevent the emergence of environmental problems. Research is needed that rigorously examines the complex process through which natural resource agencies build bridges and break down barriers to adopt a participatory model that encourages grassroots, proactive citizen participation. This dissertation fills the gap in the policy literature by examining the efforts of the Tennessee Valley Authority to adopt the watershed approach and encourage the creation of a citizen-led watershed coalition. More specifically, this dissertation is driven by three interrelated research questions. First, what are the factors that explain why natural resource agencies are democratizing decision making processes by encouraging not only an increased level of citizen involvement, but also alternative forms of participation? Second, if given the opportunity to participate, what factors partially determine whether or not, and to what degree, citizens will mobilize and get involved in ecosystem-based management of natural resources? Third, what are the characteristics of citizens that tend to participate in natural resource management and how do these individuals compare to the population impacted by management decisions? This research draws on data collected through participation-observation and two telephone surveys. We assess the impact of the reorganization of TVA's nonpower programs on its efforts to implement the watershed approach, and the efforts of the TVA's Clinch Powell Watershed Team to promote interagency collaboration and to mobilize citizen participation. We also determine the degree to

which citizens who participate in the management of the Norris Reservoir Watershed (NRW) are representative of nonparticipants who reside in the NRW. Finally, analyses of what factors predict citizen participation is presented.

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CHAPTER ONE

FROM CONVENTIONAL NATURAL RESOURCE MANAGEMENT TO ECOSYSTEM-BASED APPROACHES

I. Introduction

At the beginning of the 21st Century, natural resource agencies at all levels of government have committed to adopting an ecosystem-based approach which includes an increased role for citizen participation in resource management. Much research indicates that citizens mobilize quickly in *reaction* to an environmental problem that is perceived as a threat to individuals, communities, or a culturally-significant species. Typically, this form of citizen participation dissipates once the environmental problem has been addressed. However, natural resource agencies are advocating a different form of citizen participation, one in which citizens mobilize *proactively* in a long-term, collective effort to protect the local environment and prevent the emergence of environmental problems. Research is needed that rigorously examines the complex process through which natural resource agencies build bridges and break down barriers to adopt a participatory model that encourages grassroots, proactive citizen participation. This dissertation fills the gap in the policy literature by examining the efforts of the Tennessee Valley Authority to adopt the watershed approach and encourage the creation of a citizen-led watershed coalition.

More specifically, this dissertation is driven by three interrelated research questions that address different aspects of the role of proactive citizen participation in natural resource management. At the macro-level, we ask the question of what are the factors that explain why natural resource agencies are democratizing decision making processes by encouraging not only an increased level of citizen involvement, but also alternative forms of participation? Based on extensive literature reviews drawn from multiple fields of inquiry, we develop the argument that widespread and representative citizen participation is necessary to increase political legitimacy, improve economic efficiency, and to address natural resource science constraints. From the vantage point of political economy, we suggest that the recent trend of promoting public participation in environmental decision-making partially reflects an attempt by natural resource agencies to regain citizen trust and institutional legitimacy.

From a resource science perspective, this research contends that the problem-solving strategies of traditional natural resource management were perhaps adequate when scientific reductionism was viewed as the only legitimate epistemology, resources were managed only for consumptive uses, and the regulatory focus was on point sources of pollution. However, in an era when multiple epistemologies are valued, citizens demand the management of resources for non-consumptive uses, and the problems of nonpoint source pollution is recognized, the problem-solving strategy of post-normal science is required. Post-normal science hinges on the formation of an "extended peer community" in which discourse occurs among all stakeholders impacted by a problem. The emergence of citizen-led, collaborative decision-making teams, such as watershed coalitions, in natural resource management are viewed as extended peer communities, and as necessary to lessen the impact of nonpoint source pollution. The political economic and scientific basis of increased citizen participation are theoretically and conceptually developed in this research, but are not operationalized.

At the micro-level, we ask the question that if given the opportunity to participate, what factors partially determine whether or not, and to what degree, citizens will mobilize and get involved in ecosystem-based management of natural resources? Specific agency strategies to increase citizen participation in the management of natural resources are social processes that are embedded in a particular context. We suggest that the social and biophysical characteristics of the local context may serve as bridges and barriers to increasing citizen participation. We also hypothesize that certain political attitudes (political efficacy and trust in government) and environmental values (ecological worldview) are important in determining the likelihood of citizens participating when given the opportunity.

Finally, we ask the following question: What are the characteristics of citizens that tend to participate in natural resource management and how do these individuals compare to the population impacted by management decisions? Some research indicates that a common problem with citizen participation in natural resource management is that those who participate typically are not representative of the average citizens. We provide an empirical test of the representativeness of citizen participation and discuss the implications.

The case study used in this research is Tennessee Valley Authority's (TVA) adoption of the watershed approach. The TVA is an exemplar, and has a legacy of integrated, multipurpose river basin management which, by some accounts, is an important precursor of contemporary ecosystem-based approaches, especially the watershed approach. We examine the efforts of TVA's Clinch-Powell Watershed Team (CPWT) to change how it manages watersheds from a focus on water resources development to a more holistic, ecosystem-based watershed approach. One of the main goals of the CPWT is to increase citizen participation that is representative of the residents that live in the watershed and to facilitate the formation of a citizen-led watershed coalition. The CPWT is the first of TVA's eleven watershed teams to design and begin the implementation of a comprehensive watershed management approach.

The main premise of the watershed approach, as articulated by the Environmental Protection Agency, is that most water quality and ecosystem problems are best solved holistically, within a drainage system, rather than at the individual waterbody or discharger level (EPA1996). In contrast to traditional water resources development, the watershed approach views humans as a part of nature and not apart from it; promotes ecological integrity by maintaining biophysical processes and viable populations of native species over the long-run; focuses on entire watersheds rather than just riparian zones; expands the focus of management to both public and private lands; focuses on interrelationships between land use patterns, water quality, and aquatic health; rigorously examines the impact of nonpoint source pollution on watershed health; promotes interagency collaboration, trust, and power sharing; includes citizens as coequal partners in watershed management decisions; and reorganizes institutional structures to help public and private organizations adapt to this new management environment

In an effort to examine the bridges and barriers to watershed management in the Norris Reservoir Watershed (NRW), this research examines data collected through participation-observation and two telephone surveys. The analysis in this dissertation is presented in three related stages. In the first stage, we describe the biophysical and social context of the NRW. The biophysical context of the NRW is briefly outlined using TVA and Tennessee Department of Environment and Conservation (TDEC) documents. The social context of the NRW is described in detail by utilizing data from a random sample, telephone survey of the citizens that live in the NRW and the 1998 National Election Studies (NES). Finally, the sociodemographic and attitudinal characteristics of the watershed residents and the national population are compared on selected variables. Aggregate sociodemographic and attitudinal data for watershed residents provide, in a sense, the social context of the NRW. This research contends that the process of implementing the watershed approach in general, and mobilizing citizens in particular, is partially impacted by the social and biophysical context of the NRW.

The second stage draws heavily on participant-observation to understand the process of implementing the watershed approach in the NRW. The implementation process is best understood through TVA's efforts to reorganize its nonpower programs, and the CPWT's goals of promoting greater interagency cooperation and collaboration, and increasing the role of citizen participation in watershed management issues. The long-term goal of this process for the CPWT is the creation of an ongoing, citizen-led watershed coalition that will make decisions on watershed issues in the NRW.

Data on the emergence of the watershed coalition, including in-depth interviews of agency and citizen participants, were going to be an important empirical facet of this dissertation. Yet, after many unsuccessful attempts to recruit coalition participants from the general population of residents living in the NRW, it became clear that the citizen-based watershed coalition would not emerge in time to be included in the dissertation. As a result, the substantive focus of the dissertation shifted slightly from the bridges and barriers of watershed management to the barriers of creating a citizen-based watershed coalition. And the empirical basis of the dissertation shifted from relying more on qualitative data to a greater reliance on quantitative data obtained through two telephone surveys.

The third stage focuses more directly on the role of citizen participation. The CPWT also changed strategies from recruiting watershed coalition participants from general population by recruiting participants from a group of individuals who had participated in CPWT's Norris Public Lands Plan (NPLP). The NPLP is a public participation strategy typically employed by TVA to manage public lands and to meet the participatory requirements of the National Environmental Policy Act (NEPA) of 1969. The potential watershed coalition members are those who indicated they wanted to "be involved in a watershed coalition" on the Norris Lake Watershed Survey (NLWS). We conducted a second telephone survey, a slightly modified version of the "watershed residents" survey, of those individuals who participated in the NPLP by filling CPWT's Norris Lake Watershed Survey. We refer to this group as "NEPA participants."

With data from both the "watershed residents" and "NEPA participants" surveys, we address three research questions. First, we address the question of whether or not NEPA participants are representative of the watershed residents. Second, the survey of TVA participants provides information about a small pool of individuals from which the watershed coalition will likely emerge. Ideally, citizen participants in the watershed coalition should be representative of those who live in the watershed. We determine the likelihood that the representativeness criteria will be met by comparing the "watershed residents" to the "potential coalition participants." Third, after merging the two data sets, we present the results from two estimated logistic regression equations, the first predicting "NEPA participation," the second predicting "interest in a watershed coalition."

The answers to the above research questions, the focus of my dissertation, and TVA's adoption of the watershed approach lie at the confluence of two major societal trends. The first trend is the recent effort of federal, state, and local agencies responsible for managing natural resources to adopt a management paradigm referred to as ecosystem management. The nation-states who signed *Agenda 21* and the *Forest Principles* at the 1992 Earth Summit in Rio de Janeiro committed, although not with the force of law, to the general goals of ecosystem management of forests (Breckenridge 1995; Bucknum 1998). Shortly after the Earth Summit, the United States Forest Service officially outlined its framework for ecosystem management (Bucknum 1998).

By 1994, eighteen federal agencies adopted some form of ecosystem management as a guiding policy (Cortner and Moote 1999). Moreover, federal agencies responsible for managing a majority of the nation's land – the Forest Service, Bureau of Land Management, National Park Service, and Fish and Wildlife Service – explicitly advocated ecosystem management as the solution for natural resource controversies (Keiter 1994). This trend has not subsided. For instance, as part of President Clinton's Clean Water Action Plan, the Departments of the Interior (DOI) and Agriculture (USDA) presented a proposal, titled Unified Federal Policy to Ensure a Watershed Approach to Federal Land and Resource Management (Federal Register Feb.22, 2000). This proposal seeks to develop a unified policy on watershed management in consultation with other Federal agencies, States, Tribes, and interested stakeholders.

The second societal trend is the transition toward more participatory forms of democracy and the devolution of decision making. Some argue that political change in the United States can be understood as a series of historical adaptations to demands from the public for greater participation (Fiorino 1989). This research suggests that the transition toward more participatory forms of government partially reflects an attempt by government to rebuild legitimacy by improving its relationship with local communities. Furthermore, we contend that ecosystem-based approaches, in response to internal needs and external pressure, require the implementation of more participatory models of decision making. In a sense, we are witnessing democratization of natural resource management with virtually all federal, state, and local natural resource agencies seeking public input in management decisions.

In the last decade, the federal agencies responsible for managing a majority of the nation's public lands – Forest Service, Bureau of Land Management, National Park Service, and Fish and Wildlife Service – has been undergoing the transition from traditional natural resource management to ecosystem-based management approaches. Although still a relatively new area of inquiry, considerable literature documents the efforts of these four agencies to adopt ecosystem-based approaches on federal public lands.

II. Dissertation Overview

In the remainder of this chapter, we provide a brief outline of the historical relationship between natural resource management and social, political, and cultural change in the United States. This selective historical sketch provides the context of this research and highlights the roots of ecosystem management. This chapter closes with a discussion of the major characteristics of ecosystem management and outlines the commonly accepted principles of ecosystem management. Chapter Two outlines the history of water resources development and watershed management in the United States. Chapter Two closes with an argument that of the ecosystem-based approaches, the watershed management approach is the most rigorous and has the most promise in addressing the critical natural resource management problems of the 21st Century.

The main focus of Chapter Three is citizen participation. At the macro-level, we explain the necessity (or perceived necessity) of increased citizen participation in governmental decision-making from political economic, scientific, and natural resource management perspectives. At the micro-level, we hypothesize that certain political attitudes and environmental values are important in determining the likelihood of citizens participating when the opportunity arises. This chapter closes with the delineation of a set of hypotheses. Chapter Four discusses the methodological strategies and statistical techniques employed in this dissertation. Chapter Five defines the biophysical and social context that characterizes the Norris Resource Watershed, contextual factors that may impact the ability of the Clinch Powell Watershed Team to implement the watershed approach in the NRW. Chapter Six presents the analysis of the participant observation data and the two telephone surveys. Finally, Chapter Seven provides a discussion and conclusion.

III. Natural Resources Management

The substance of environmental legislation and statutes, natural resource agency philosophies, mission statements, and resource management practices elucidate how societies, communities, and individuals view their relationship with the environment. As such, natural resource agencies are embedded in a broader social-context, and public lands managers serve as more than just stewards of land, but also as individuals charged with maintaining the ongoing relationship between nature and society. The contours of this relationship are created and recreated as society changes. Momentous change challenges the adaptability or flexibility of natural resource agencies who must reinvent themselves by adjusting their organizational structure and culture, management style and practice to maintain itself as a legitimate social institution. In this section, we provide a brief overview of the history of traditional natural resource management in the United States.

A. Historical Sketch of the American Experience[1]

From colonial times to 1860s, referred to as the "acquisition era," competition and conflict between the original thirteen colonies arose over Western territories which threatened the balance of power (Laitos and Carr 1999). As a result, the Constitution gave newly acquired territories – through purchases, annexations, and treaties – to the federal government rather than to individual states (Laitos and Carr 1999). During the "disposal era," in an effort to encourage the development of the West, the federal government transferred land to farmers through various homestead acts and to railroads as inducements to build tracks westward (Laitos and Carr 1999). In response to massive destruction of the nation's natural resources by rapid industrialization, the progressive

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Note that this outline of the changing relationship between natural resources and society is incomplete, as we do not discuss relationships between non-Western and precapitalist societies and the environment. As Berkes and Folke (1998) claim, "non-Western knowledge systems have received relatively little attention from a resource management point of view" (p.14), which is regrettable given that some of these communities have coexisted with, and more important, adapted to their environment, using resources in ways that maintained sustainable ecosystems (Gadgil, Berkes and Folke 1993; Hollings, Berkes and Folke 1998; Norgaard 1994). As global capitalism continues to eradicate precapitalist communities, we squander "humanity's wealth of adaptations" (Holling et al. 1998). However, this legacy may not be completely lost. The more philosophical tenets of ecosystem management, such as holism, and the attempt to include the spiritual values, aesthetic values, and local knowledge in management decisions seems to reflect some of the precapitalist and/or non-Western relationships with the environment. Unfortunately, it is beyond the purview of this study to adequately incorporate the growing literature on traditional knowledge systems and resource management.

conservation movement emerged in the late nineteenth century. The closing of the American frontier in 1890 encouraged people to reflect on their relationship with the environment, as people were forced to accept the boundedness of the continent and that nature resources were not limitless (Cable and Cable 1995). With the emergence of a new conservation ethic and a growing consensus that federal government should reduce the transfer of federal land to private hands, we see the roots of the current management era (Laitos and Carr 1999).

The relationship between natural resources and society revealed itself in a variety of institutional forms at the turn of the twentieth century. For instance, in 1891, the government established Yosemite National Park. A number of national environmental organizations – for example, the Sierra Club and the Audubon Society – were established with a rapidly expanding membership of upper-middle class citizens (Dunlap and Mertig 1992; Nash 1989). Congress responded to the objectives of the progressive conservation movement by enacting the Forest Management Act (1897) and the River and Harbor Act (1899). The first Western natural resource discipline, forest science, originated during this period and was taught in an increasing number of land-grant universities (Knight and Bates 1995).

Eventually, the progressive conservation movement split into two factions -- the conservationists and the preservationists. On one hand, conservationists, such as Gifford Pinchot, emphasized the wise management of natural resources for continued human use (Dunlap and Mertig 1992). The position that provides the ethical foundation for conservationism is "utilitarianism" which "by definition, calls for using natural resources to maximize human benefits . . . (Keiter 1994:296). On the other hand, preservationists, such as John Muir, argued for the preservation of nature for its own sake (Dunlap and Mertig 1992). The position that provides the ethical foundation for preservationism is the "intrinsic rights" perspective which argues that animals and plants have an intrinsic right to exist independent of their worth to humans (Nash 1989). Until the late 1960s, Pinchot's conservationist perspective dominated natural resource legislation and management.

Federal public lands, consisting of approximately one-third of the United States' entire land base, were managed according to the utilitarian concept of "sustained yield" (Anderson 1995) and the philosophy of "multiple use" management (Laitos and Carr 1999). The concept of sustained yield assumes that natural resources are renewable and continuous production can be maintained through scientific planning and management (Anderson 1995). Multiple use implies that numerous activities can be carried out simultaneously on federal public lands (Smith 1995). Although multiple use has been the dominant practice since the turn of the century, the philosophy gained legislative support via the Multiple Use Sustained Yield Act of 1960 and the Classification and Multiple Use Act of 1964.

Despite continued procedural adherence to the multiple-use approach to resource management, agencies narrowly managed public lands from the turn of the century until the late 1960s to maximize the sustained yield of a single, market-oriented resource: the Forest Service managed for timber production (Brunson and Kennedy 1995; Cortner and Moote 1999; Keiter 1994; Laitos and Carr 1999), the Bureau of Land Management managed forage for cattle and sheep grazing (Brunson and Kennedy 1995; Cortner and Moote 1999; Keiter 1994; Laitos and Carr 1999), the National Park Service managed to enhance visitor usage (Cortner and Moote 1999), the Bureau of Reclamation managed to maintain water supply for farm irrigation (Cortner and Moote 1999; Laitos and Carr 1999), and the Tennessee Valley Authority managed for power production, flood control, and river navigation.

Over this six-decade period, natural resource scientists and managers developed close alliances with the extractive industries that were dependent on federal land (Knight and Bates 1995). "This 'capture' of multiple use agencies," according to Laitos and Carr (1999), "is due in part to the broad authority afforded public lands managers, the courts' refusal to overturn exercises of agency discretion that make commodity uses a preferred multiple use, and relentless pressure by mining, timber, and stockman's interest" (p. 212). The failure of multiple use statutes to provide clear standards that constrained the discretion of federal managers (Smith 1995), the fact that public lands were managed solely for economic value (Smith 1995) and an overly close relationship between resource agencies and extractive industries (Knight and Bates 1995) set the stage for growing public distrust of natural resource agencies in the 1960s.

Brunson and Kennedy (1995) suggest that "four societal trends" during the 1960s and 1970s "greatly affected the society-nature relationships: economic expansion; technological innovation, migration to cities and suburbia; and increased public perception of resource scarcity" (p. 143). Just as the progressive conservation movement at the turn of the century was partially responsible for the emergence of traditional resource management, greater public awareness of environmental issues and widespread support for the environmental movement were influential in modifying how resources are managed today. For instance, citizens demanded that public lands be managed for nonconsumptive uses as well as consumptive economic uses (Brunson and Kennedy 1995). Congress responded to greater public and interest group pressure by enacting new laws in the late 1960s and early 1970s that explicitly forced agencies to manage for nonconsumptive uses – such as, recreation, preservation, ecological, aesthetic, and spiritual uses.

Taken together, these new laws restricted the resource managers' discretion (Brunson and Kennedy 1995) limiting the impact of "agency capture" on land management decisions. The Wilderness Act of 1964 granted Congress authority to designate which public lands will be protected as a part of the National Wilderness Preservation System (McGregor 1994). The National Environmental Policy Act (NEPA) of 1969 has profoundly impacted natural resource management. Under NEPA, federal agencies must prepare an Environmental Impact Assessment (EIA) for each major federal project in which the impacts of the project on water pollution, wildlife, land use, wetlands' protection, and flood control are described in detail (McGregor 1994; Spyke 1999).

Three major implications of NEPA are central to this dissertation and perhaps the success of ecosystem management. First, NEPA created a process that institutionalized the inclusion of citizen input in agency decision making (Adler 1995; Machlis 1999). Second, NEPA encouraged interagency collaboration (Adler 1995; Keiter 1990). Third, through the EIS process, NEPA required resource managers to consider the cumulative impacts of all land use actions (Adler 1995). This requirement encourages managers to view public lands from a more systemic perspective. Although NEPA is substantively weak, "it has become a powerful law of environmental process on the public domain" (Keiter 1990:59).

Following NEPA, the first and only Federal agency whose primary responsibility was to protect the environment were created by Congress in 1970. The Environmental Protection Agency (EPA) was created without an organic statute that drives its actions; as such, the EPA obtains its powers and responsibilities through eleven major environmental statutes (Geltman and Skroback 1998).[2] This fragmented statutory approach to environmental protection belied any vision of an integrated environmental protection approach and has since impeded the EPA's ability to systematically prioritize the environmental problems of the nation (Geltman and Skroback 1998).

As new environmental legislation was enacted in the 1970s, the complexity of natural resource management and environmental protection increased as resource manager's decision making latitude decreased. Laitos and Carr (1999) provide an example of this trend when they state that:

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As identified by Geltman and Skroback (1998:6), the EPA derives its fragmented powers and responsibilities from the following major environmental statutes: Federal Insecticide, Fungicide, and Rodenticide Act, Toxic Substances Control Act, Federal Water Pollution Control Act, Marine Protection, Research and Sanctuaries Act, Safe Drinking Water Act, National Environmental Policy Act, Noise Control Act, Solid Waste Disposal Act (also referred to as the Resource Conservation and Recovery Act), Clean Air Act, Comprehensive Environmental Response, Compensation, and Liability Act (commonly known as "Superfund") and Emergency Planning and Community Right-to-Know Act.

> "... multiple-use BLM and Forest Service lands cannot support a resource extraction industry if they are (1) classified as national park system units, wilderness, or wildlife refuges; (2) designated as critical habitat for endangered species; (3) developed for recreational use (e.g., for mountain biking or skiing); and (4) subject to excess restrictions that prevent commodity development. As a result of Congressional and agency decisions, the multiple-use land base has been halved since 1934" (p. 173).

Some of the legislation of the early 1970s included the Clean Air Act of 1972, the Clean Water Act of 1972, the Marine Mammal Protection Act of 1972 (MMPA), and the Endangered Species Act of 1973 (ESA). The latter two Acts are important for a number of reasons. The environmental legislation created from the 1880s to the 1930s was driven by conservationism and was explicitly utilitarian. Arguably for the first time, the ESA and (to a lesser degree) MMPA represents environmental legislation written from an intrinsic rights perspective (Nash 1989). The ESA was unprecedented in its scope for three reasons: first, the law granted protection for all endangered species independent of their current value to humans; second, the law defined harm to a species directly as killing its members, but also indirectly as harm to the environments on which species depended; and third, the law protects species on public land, but also extended protection to species on private land (Nash 1989). The legal recognition that protecting endangered species requires the protection of the ecosystems in which they live is significant, as it indirectly fosters a more systemic ecosystem approach (Nash 1989; Sax 1997).

A number of laws were also enacted in the 1970s that directly mandated agencies to manage public lands on a systemic level (Brunson and Kennedy 1995). For instance, the Forest and Range Renewable Resources Planning Act of 1974 (RPA) and the

National Forest Management Act of 1976 (NFMA) mandated that the Forest Service undertake an enormous planning effort to develop comprehensive management plans for the entire National Forest System (Debonis 1995). Likewise, the Federal Land Policy and Management Act of 1976 (FLPMA) directed the Bureau of Land Management (BLM) to identify all roadless areas of 5000 acres or more (Parker 1995). On Congressional recommendation, these areas potentially would be added to the National Wilderness Preservation system (Parker 1995). For the Forest Service and BLM, the new legislation posed a challenge since these agencies had greater Congressional oversight, new management tasks, and a shrinking budget (Brunson and Kennedy 1995).

The National Park Service (NPS) and the Fish and Wildlife Service (FWS) are two important natural resource agencies whose historical missions reflect a preservation orientation. On the strength of the conservation movement at the turn of the 20th Century, enough political support was mobilized to enact the National Park Service Organic Act of 1916 (Laitos and Carr 1999). This Act created that National Park Service. From its inception, it had the dual and often conflicting mandates of managing lands for recreational use and preserving land for posterity (Laitos and Carr 1999; Nelson 1995). As park visitation increased, so did the growth of the park system (Smith 1995). Added to the tension of resolving conflicting mandates, in the 1960s the NPS also faced the lobbying pressure from the increasingly powerful environmental movement and the rise of recreational interest groups. This contentious dynamic is still unfolding today.

In 1940, an Executive Order by the Roosevelt Administration created the Department of Interior's Fish and Wildlife Service (FWS). The FWS was created through the amalgamation of the Bureau of Fisheries, created in 1871 in the Department of Commerce, and the Bureau of Biological Survey, established in 1886 in the Department of Agriculture (Laitos and Carr 1999; Nelson 1995; Smith 1995). Managing the National Wildlife Refuge System (NWRS) is the central responsibility of the FWS (Laitos and Carr 1999; Nelson 1995). The primary mission of the FWS is to manage refuges to protect wildlife for its own sake, maintain game habitats for fishing and hunting, and provide land for recreational purposes (Nelson 1995). Yet, in practice, refuges were typically managed for maintaining game habitats and, in some cases, were open to oil and gas leasing and grazing (Brunson and Kennedy 1995). Note that although the NPS and FWS were created with preservation as a stated objective, the agencies were still driven by utilitarianism. Land was preserved for people to use recreationally in its "wild" state and for the use of future generations.

Laitos and Carr (1999) provide strong evidence that a dramatic shift has recently occurred in how public lands are used. Such a shift is partially due to post-WWII demographic change, public value change, and citizen pressure with recreation and preservation replacing commodity production. Those agencies (e.g., the BLM and Forest Service) who had a historically entrenched relationship with extractive industries and managed land for commodity production were reticent to accommodate citizen demands for noncommodity values (Brunson and Kennedy 1995). Conversely, due to a historical focus on managing land for recreation and wildlife habitats, the FWS and NPS were better positioned to allay citizen demand for noncommodity values (Brunson and Kennedy 1995). Recreational use of public lands increased dramatically over the last several decades, and all agencies have greatly expanded the percentage of land used for recreation and/or preservation (Laitos and Carr 1999). Thus, the historically close relationship between resource agencies and extractive industries deteriorated.

Laitos and Carr (1999) also show, through a benefit-cost analysis, that managing for recreation and preservation is more economically efficient than a taxpayer-subsidized, federal system that managed for resource extraction. In the late 1990s, outdoor recreation generated hundreds of billions dollars annually, surpassing timber harvesting, grazing, and mining as the economic force on Western public lands (Laitos and Carr 1999). In light of their analysis, Laitos and Carr (1999) conclude that resource use conflicts of the 21st Century will not be between the traditional battles of extractive industries versus environmentalists, but rather between recreationists versus preservationists. This new dynamic is illustrated by the recent trend of national park management shifting from a dominant focus on recreation to a preservation orientation. For instance, Yosemite National Park is being returned to a more pristine condition through the planned reduction of parking lots, roads, bridges, and buildings in the park (Nieves and Wald 2000).

Despite the strongly worded mandates coming out of the1970s legislation, considered the "golden age" of public lands legislation, some regional natural resource agencies rejected land use trends through continued adherence to the antiquated, market-oriented bias of resource extraction. For example, Federal Judge Dwyer, in 1991, castigated the Forest Service for a timber sales program in the northwest that lacked a credible management plan for the Brown Spotted Owl. He was quoted as saying that:

> More is involved here than a simple failure by an agency to comply with its governing statute. The most recent violation of NFMA [National Forest Management Act] exemplifies a deliberate and systematic refusal by the Forest Service and the FWS [Fish and Wildlife Service] to comply with laws protecting wildlife. This is not the doing of scientists, foresters, rangers, and others at the working levels of these agencies. It reflects decision made by higher authorities in the executive branch of government (as quoted in Debonis 1995:169).

Clear evidence points to the argument that the growth of the environmental movement had a major impact on the proliferation of environmental legislation. By the mid-1970s, however, it appeared that the environmental movement reached a plateau (Albrecht 1976) and gradually declined through the late 1970s, a trend explained by citizen complacency due to the proliferation and success of environmental legislation in the 1970s (Dunlap 1992). This complacency changed to outrage, as the "Reagan Administration quickly exceeded environmentalists' worst fears" given that "the Council on Environmental Quality was virtually eliminated, the budget of the Environmental Protection Agency was severely cut, and the enforcement of environmental regulations was curtailed by administrative review, budgetary restrictions, and staff change" (Dunlap 1992:102). In addition, the Reagan Administration, through an Executive Order (No. 12,291), forced the Environmental Protection Agency to undergo a Benefit-Cost Analysis (BCA) before the implementation of any environmental regulation (Thompson 1999).

The Reagan Administration misread public sentiment, as his attempt to dismantle environmental polices led to significant increases in public support for environmental protection (Cable and Cable 1995; Dunlap and Scarce 1991). During the 1980s, evidence of a reinvigorated environmental movement can be found in the dramatic member increases in national environmental organizations (Mitchell, Mertig, and Dunlap 1992), the emergence of radical groups within the environmental movement (McCloskey 1992), and the mobilization of grassroots "not in my back yard" (NIMBY) groups around localized toxic issues (Cable and Cable 1995; McCloskey 1992). The Reagan Administration's aggressive anti-environmental posturing not only backfired thus solidifying the environmental movement, but it also expanded the movement to include a broader socioeconomic spectrum of environmentalists in its ranks.

The 104th Congress was apparently not aware of the public's backlash toward Reagan's anti-environmentalism campaign or they erroneously assumed the public values on the environment had changed. The Republican freshmen in Congress staged an assault on environmental protection on three levels: first, an unsuccessful attempt was made to repeal core environmental legislation; second, an unprecedented number of anti-environmental riders were attached to the appropriations of environmental programs which were later vetoed by President Clinton; and third, a successful attempt was made to cut the EPA's funding (Geltman and Skroback 1998). Geltman and Skroback (1998) contend that environmentalism must be considered among a set of core American values, a fact overlooked by the freshmen of the 104th Congress as they "... misconstrued the popular frustration with regulatory procedure and a complex and often combative bureaucracy for a broad electoral distaste for environmental law in general" (p. 3).

The point of this brief and selective historical sketch of the relationship of society and natural resources is to demonstrate that the relationship between society and natural resources is complex and dynamic, involving sociological, political, economic, and environmental factors. Another purpose of this overview is to situate some of the roots of ecosystem-based management approaches in a broader historical context. Overall, there are a number of significant resource management adaptations, though *ad hoc* and piecemeal, over the last few decades that anticipate some of the fundamental tenets of ecosystem-based approaches. These adaptions, more broadly, reflect an attempt by natural resource agencies to respond to persistent anomalies that are undermining the paradigmatic status of traditional natural resource management.

At least five adaptations are worth noting. First, a more intrinsic rights perspective was reflected in the MMPA and ESA. Thus, natural resource management broke with its absolute allegiance to the utilitarian perspective. Second, public lands started to be managed for nonconsumptive values, with recreation and preservation gradually supplanting resource extraction as the primary land use. This reflects a shift of managing land for one dominant value to managing land for multiple values. Third, NEPA dramatically increased the role of citizen participation in agency decision making and promoted greater interagency collaboration. Fourth, legislation that encouraged a more systemic management perspective (e.g., the RPA, NFMA, FLPMA and, to a lesser degree, ESA) provided the procedural foundation for natural resource science to move beyond a sole reliance on scientific reductionism and discipline-specific analyses, since a systemic approach requires interdisciplinary analyses across mediums, species, and scales. Fifth, efforts were made to move toward a more comprehensive management framework as a means of resolving problems that attend a fragmented environmental protection and resource management system. These changes may provide some of the building blocks for the successful implementation of ecosystem management.

B. Challenges of the 21st Century

Despite the changes that occurred in the 20th Century, traditional natural resource management is still not well-suited to address contemporary natural resource issues (Holling et al. 1998; Knight and Bates 1995). Traditional natural resource science is based on a reductionistic, linear, mechanistic, closed-system model of the empirical world that does not correspond with the current understanding of how ecological systems work. Traditional management is based on a utilitarian conservation philosophy that reflects the needs and conditions of the progressive conservation era, but hardly fits the needs and conditions of today. For instance, the utilitarian multiple use doctrine, which was narrowly interpreted as managing land for economic development, is incompatible with a public that increasingly demands that noneconomic values be incorporated in land use decisions (Knight and Bates 1995). Natural resource agencies and agents have traditionally maintained legitimacy as reservoirs of expertise, but this legitimacy has been challenged as citizens increasingly charge that science is not value-free, expertise is politicized, and lay knowledge should be valued in decision making.

Even more daunting than problems presented above for natural resource managers are the challenges of addressing a range of environmental concerns that are new or have slipped through the cracks of environmental regulation and resource management. Haeuber (1996) contends that "the last 25 years of increased environmental awareness in the United States, and the policy and regulatory changes it engendered, addressed the easily picked, 'low-hanging fruit' of environmental issues . . . " (p. 2). At the turn of the 21st Century, we are witnessing the unprecedented negative impacts of human activity on the biological, hydrological, climatological, and terrestrial systems of earth (Ewert 1996). We are only beginning to comprehend the scope and magnitude of these problems.

More specifically, Mein (1995) identifies a number of trends that illustrate the complexity of environment problems and perhaps reveals and magnifies the increasingly corrosive relationship between society and the environment. The impact of environmental pollution can be seen in the decline and waste of urban neighborhoods, the desperate spread of suburbia and the frenetic rise of 'edge cities,' the stresses placed on agricultural soils and waters, the clearing and fragmentation of forests under intensified logging pressures, the continued loss and degradation of wetlands, deserts, and other wildlands, the inability to insulate national parks and other protected areas from air- and water-borne pollutants and other transboundary threats, the decline of important fisheries as a result of overharvesting and the disruption of the aquatic systems that support them, and the endangerment of life's genetic, species, and ecosystem variety. Given that most of the 'low-hanging fruit' has been picked, the above more complex environmental problems must be addressed.

C. Ecosystem-Based Approaches

The fundamental assumptions and tenets of the traditional paradigm of natural resource management have remained unchanged since it displaced the 'disposal philosophy' of the 19th century (Nelson 1995). The complexity of contemporary environmental problems is increasingly apparent, as the political, economic, social, and cultural aspects of these issues are revealed (Haeuber 1996). As such, the traditional paradigm of natural resource management, with its reliance on scientific reductionism and discipline-specific analyses, precludes the ability to capture the broader 'systemic' and 'transdisciplinary' nature of environmental problems (Meine 1995). The call for more interdisciplinary approaches to address contemporary environmental problems had become commonplace by the late 1980s and, by the early 1990s, traditional natural resource management gradually entered into a crisis of legitimacy (Clark, Stankey, and Kruger 1999; Holling et al. 1998).

In response to this crisis, a number of alternative natural resource approaches have been advocated by academics and natural resource agencies. We are using the concept "ecosystem-based approach" (Imperial 1999) as a generic term to refer to any holistic management approach whose primary foci are ecosystems. Recent resource management literature has produced numerous ecosystem-based approaches, such as "integrated environmental management" (Born and Sonzogni 1995; Margerum 1997; 1999; Schramm 1980), "integrated coastal management" (Cicin-Sain 1993), "integrated resource management" (Bellamy et al. 1998), "watershed management" or "watershed approach" (Adler 1995; Anderson 1999; EPA 1996; Golden 1998; Goldfarb 1994;

Johnson 1998; Lewis and Slider 1999; McGinnis, Woolley, and Gamman 1999; Michaels 1999; Montgomery, Grant, and Sullivan 1995; Pratt and McNitt 1998), "cooperative ecosystem management" (Yafee et al. 1996), "grassroots ecosystem management" (Weber 1999), "adaptive management" (Gunderson, Holling, and Light 1995; Holling 1978; 1995; Lee 1991; 1993; McLain and Lee 1996; Walters 1986), and "ecosystem management" (Clark et al. 1999; Cortner and Moote 1999; Duane 1997; Franklin 1997; Freemuth 1997; Grumbine 1994; 1997; Haeuber 1996; Harwell et al. 1996; Keiter 1990; 1994; Pendery 1997; Salwasser 1999; Wallace et al. 1996; Williams and Patterson 1996; Yafee et al. 1996).

Certainly, the eight ecosystem-based approaches listed above are not monolithic. Yet, the fundamental canons that underlie each approach, and the substantive and procedural objectives that presumably guide management decisions, are notably similar. The term ecosystem management (EM) has gained widespread acceptance as the concept of choice to describe the current shift in natural resource management. Grumbine (1994) provides a broadly accepted definition of ecosystem management: "Ecosystem management integrates scientific knowledge of ecological relationships within a complex sociopolitical and value framework toward the general goal of protecting native ecosystem integrity over the long term" (p. 28). We will now outline eight fundamental principles of ecosystem management. Along with each principle, we will describe its corresponding counterpart as articulated by the old paradigm of traditional natural resource management. Table 1 provides a brief summary of the comparison between ecosystem management and traditional natural resource management. These principles

Table 1: Traditional Natural Resource Management and Ecosystem-Based Approaches: A Comparison.

	Traditional Natural Resource Management		Ecosystem-Based Approaches
I.	Multiple-use doctrine, maximum sustained yield, economic growth	I.	Sustainability
II.	Reductionistic, mechanistic, disciplinary, linear view of evolution	II.	Systems perspective, holistic, interdisciplinary, non-linear view of evolution.
III.	Scale independent or narrow range of scales	III.	Broad spatial and temporal scales, nested scales
IV.	Humans external to ecosystems, exempt from ecological processes.	IV.	Humans are members of ecosystems, influenced and impacted by ecological processes.
V.	Scientific objectivity, value-free science	V.	Socially constructed goals and objectives, science value-laden
VI.	Expertise model, top-down approach	VI.	Collaborative decision model, bottom-up approach
VII.	Bureaucratic, hierarchical, rigid	VII.	Adaptive management, flexible, iterative, institutional learning, decentralized
VIII.	Limited data collection, no monitoring	VIII.	Extensive data collection and monitoring

are primarily drawn and adapted from four articles that provided extensive reviews of the literature on ecosystem-based approaches (Grumbine 1994; 1997; Haeuber 1996; Wallace et al. 1996).

The first principle of EM is sustainability. On one hand, Haeuber (1996) suggests that sustainability (ecological, socioeconomic, and cultural) is a precondition for EM; on the other hand, others suggest that EM is necessary for sustainability (Franklin 1997; Golden 1998; McCormick 1997). A standard definition of sustainability is "the existence of the ecological conditions necessary to support human life at a specified level of well-being through future generations" (Lele 1991:609). The principle of sustainability has replaced the traditional resource management's multiple use doctrine, which was narrowly interpreted as managing land for economic development (Knight and Bates 1995; Smith 1995). The growing critique of the multiple-use doctrine, supported and reified by traditional resource science, was based partly on its inability to "prescribe sustainable outcomes" (Holling et al. 1998:352).

The second principle is that EM is based on a systems perspective (Grumbine 1997; Haeuber 1996; Slocombe 1993). Central to the systems perspective is that ecosystems exist at multiple scales with no particular scale inherently more strategically meaningful from a management perspective than another (Haeuber 1996). One objective of EM is to better understand the complexity of systems by examining the interconnectedness of contiguous and nested scales (Slocombe 1993). The systems perspective recognizes that ecosystems are dynamic, open systems (Haeuber 1996), evolving across time and space in a non-linear fashion (Holling et al. 1998). Traditional resource management tended to manage public lands as static, discreet closed systems that evolve in a linear fashion. In other words, EM attempts to understand better the relationships between parts, between parts and the whole, and between different wholes with the long-term goals of sustaining biodiversity and ecological health. In contrast, traditional resource management attempted to control the relationship between a few different parts to maximize the relatively short-term production of commodity resources.

The third principle, which is closely related to the second principle, is the recognition that ecosystem processes unfold over a varied range of spatial and temporal scales (Clark et al. 1999; Haeuber 1996; Wallace et al. 1996). EM suggests that the geographic focus of management should be defined by ecosystem boundaries, which typically do not correspond with extant administrative, political and ownership borders (Haeuber 1996). Addressing this principle is often the initial step of EM as it requires bringing together all interested parties to define appropriate boundaries for management and to identify environmental problems therein (Grumbine 1997). Furthermore, ecological processes typically unfold at a relatively slow rate that impedes measurement given the current level of instrument sophistication. Thus, the management of long-term ecological processes, marked by much scientific uncertainty, does not correspond well with the short-term political vagaries of natural resource management. Traditional resource management, with little regard for ecological processes, was not concerned with broad spatiotemporal scales but rather focused on the short-term production of commodity resources through invasive management techniques.

The fourth principle of EM is the seemingly intuitive notion that humans are embedded in ecosystems (Grumbine 1997; Haeuber 1996; Slocombe 1993). Some argue that beginning in the late 1970s citizens began to view nature from a different perspective, from an ecological worldview that perceives humans as simply one of many species not exempt from ecological principles (Dunlap and Van Liere 1978). As Field (1996) argues, "... [T]he emphasis now placed upon ecosystem management, landscape scale analysis and watershed further presume humans and social systems are a part of the resource equation (p. 250). Since the Enlightenment, however, Western thinkers have separated humans from the rest of nature (Gladwin, Kennelly, and Shelomith 1995). The separation of humans from nature provided the ontological foundation for a worldview, especially in the American experience, where humans perceive nature as objects to be mastered and dominated (Wallace *et al.* 1996). Of course, this worldview had a profound impact on the way natural resources were (and arguably still are) managed. Traditional natural resource management has treated humans as external to the resources to be managed, as guests or visitors to the system (Field 1996).

The fifth principle of EM is the recognition that all resource management and planning decisions are partially based on socially constructed goals and objectives that may change across space and time (Haeuber 1996; Wallace et al. 1996). This principle reflects the epistemological stance that even the more scientifically-based concepts, criteria, and measures are essentially value-laden (Wallace et al. 1996). Traditional natural resource managers, who viewed the empirical world as mechanistic and linear, adhered to the principle that management decisions should be based on an objective scientific 'truth' that is devoid of values. Actively including the sociocultural dimensions of resource management in decision making enables EM to move beyond the largely mechanistic, detached expertise model of traditional natural resource management. Furthermore, scientific positivism is being undermined as citizens increasingly charge that science is value-laden, expertise is politicized, and lay knowledge should be valued in decision making.

EM's focus on managing cross-scale ecosystems is conducive for adhering to the sixth principle, a collaborative decision building model (Clark et al. 1999; Haeuber 1996; Wallace et al. 1996). This model promotes interagency cooperation (Clark et al. 1999; Grumbine 1994), interdisciplinary research, and citizen involvement (Clark et al. 1999). With the call for interdisciplinary perspectives, the social sciences are beginning to play a more prominent role in research in resource management (Mein 1995). A decision making process that brings together all relevant stakeholders – such as, government agencies, tribal organizations, industry, and citizens – enable managers to make informed decisions that take into account contextual factors and lay knowledge. The collaborative decision building model is somewhat of a grassroots, bottom-up process of generating a consensus on how public lands should be used. Traditional resource management, on the other hand, was based on an expertise model in which decision were made by smaller number of highly centralized managers and scientists. This top-down process of decision making omits any meaningful inclusion of stakeholder or citizen input.

The seventh principle is adaptive management (Haeuber 1996; Grumbine 1994; Wallace et al. 1996). A management paradigm should accept scientific uncertainty and the non-linearity of ecosystem change and be implemented by flexible, adaptable organizations (Grumbine 1997). Adaptive management "treats policies as hypotheses, and management as experiments" (Holling et al. 1998:358) and "[b]ecause of its ongoing, iterative nature, the process enables adaptation to new information, to changing societal goals, and to long-term environmental change (English et al. 1999:25). An endorsement of adaptive management is a rejection of the 'domination over nature' worldview, adhered to by traditional natural resource management, as it accepts the view that nature is uncontrollable.

For federal resource agencies, the transition from traditional resource management to adaptive management will require considerable organizational change. Traditional natural resource management assumes that the scientific method establishes one truth, independent of contextual factors, which can be disseminated top-down in a centralized, hierarchical bureaucratic system (Nelson 1995). Adaptive management, on the other hand, which forsakes the search of universal truth, requires a more flexible, decentralized organization structure to manage public lands (Nelson 1995). Holling *et al.* (1998) are advocates of adaptive management by suggesting that "flexible social systems that proceed by learning-by-doing are better adapted for long-term survival than are rigid social systems that have set prescriptions for resource use" (p. 56). The Clean Water Action Plan of 1998 articulates such a perspective by stating that resource activities are 'living laboratories' for adaptive management of watersheds and water quality.

EM places a premium on data collection and monitoring which is the eighth principle (Grumbine 1994; Haeuber 1996). Grumbine (1997) makes a distinction between "the science behind data collection (gathering primary information) and . . . the science behind testing data against management activities or experiments (monitoring)" (p. 44). Since traditional natural resource management measured success by resource commodity output, extensive data collection and tracking management actions through monitoring was not cost-effective (Grumbine 1997). Ecosystem management, given that it attempts to understand the complexity and interconnectedness of ecological processes, requires extensive data collection and monitoring.

Note that ecosystem management in its current form is conceptualized as a grassroots, bottom-up approach to making management decisions in a local context. As such, the relative importance placed on implementing each of the eight ecosystem management principles is not universal, but is contextualized reflecting the ecological, social, political, and economic conditions and needs of a particular community and ecosystem. An ecosystem management approach that does not embrace context-specific factors will likely fail.

CHAPTER TWO

FROM WATER RESOURCES DEVELOPMENT TO WATERSHED MANAGEMENT

I. Introduction

In Chapter One, a brief outline of the historical relationship between natural resource management and social, political, and cultural change in the United States were presented, in part, to highlight the context from which ecosystem-based approaches emerged. The history of water resources development and management in the United States are sufficiently distinct from natural resource management, more generally, to warrant the historical outline below. Chapter Two briefly outlines the importance of water as a natural resource. Additionally, the history of water resources development and watershed management in the United States is outlined. Finally, this chapter closes with an argument that of the ecosystem-based approaches, the watershed management approach is the most rigorous and has the most promise in addressing the critical environmental resource problems of the 21st Century.

Although approximately 71% of the earth's surface is covered by water, only 3% is freshwater and .003% is readily available for use as groundwater, soil moisture, water vapor, and lakes and streams (Miller 1998). Water, a dynamic resource, circulates throughout the planet via the hydrological cycle (MacKenzie 1996). Through processes such as precipitation, infiltration, percolation, transpiration and evaporation, the hydrological cycle purifies, recycles and distributes water (Miller 1998). Water is among the most important natural resources on this planet, as it is a fundamental element of all living matter (MacKenzie 1996). Beside its ecological significance of sustaining terrestrial and aquatic life, water is integral to more explicitly human-centered activities – such as, agriculture, industry, transportation, and recreation (MacKenzie 1996).

Conflicts over water are based on the fact that the volume of accessible freshwater is somewhat decreasing and, perhaps more important, the competition for its use is increasing. The accessibility of usable freshwater is decreasing due to two fundamental, related factors. The first factor is water quantity. The amount and location of water obtainable for human use and available for sustaining aquatic ecosystems have been significantly impacted by dams, pumps, diversions and other engineered structures (World Resources Institute 2000). According to the most recent data available, the World Resources Institute (2000) found that almost 60% of the world's largest 237 rivers are strongly or moderately fragmented by dams, diversions, or canals; large dams have increased sevenfold since the 1950s, impounding 14 percent of the world's runoff; approximately half of the water readily available for human use is withdrawn from rivers; and almost half of the world's wetlands have been lost in the 20th century. The second factor is the degradation of water quality, occurring directly via nutrient and/or chemical pollution, or indirectly when soil erosion increases due to land use changes or when the ability of ecosystems to purify water is lessened (World Resources Institute 2000). The projections are grim: "By 2025, at least three billion people could be living in countries experiencing chronic water shortages, ecological degradation, and loss of biodiversity from overuse of limited water supplies" (Miller 1998:511).

If water is one of the most important natural resources, why have we allowed the volume of usable freshwater to decline at such a precipitous pace? Recognition of the water quantity problem may have been impeded by the seemingly ubiquitous nature of water which masks the fact that such a small percentage of it is usable (MacKenzie 1996). Overuse of water resources generally is not as observable as the exploitation of other renewable resources, such as clearcutting a forest. Furthermore, trees do not fall from the sky to replenish existing forests. Recognizing water quality problems is also complicated. The distinction between uncontaminated and contaminated water is questionable, not based on fact – a distinction predicated on the scientific knowledge of the day, the precision of the instruments being used, and the politics of water quality issues. We certainly have a more sophisticated scientific understanding of the hydrological cycle, watersheds, and ecosystems today than thirty five years ago. Water resource managers have had to rethink the way policy processes and institutions are structured, as water resources have become increasingly exhausted and degraded (Light and Wodraska 1990).

II. History of Water Resources Development and Management

The relationship between ancient civilizations and the management of major river system's date back to the sixth millennium BC (Newson 1997). Managing rivers for rudimentary irrigation and flood control created conditions for large-scale agriculture and food surpluses, thus freeing up labour to build the nonagricultural structures central to early civilizations (Newson 1997). The ability to harness major rivers resulted in the emergence of a number of civilizations in large river basins between 5000 and 2000 BC – such as, the Sumerian civilization in the Tigris and Euphrates River basins, the Egyptian civilization in the Nile River basin, and the Harappan civilization in the Indus River basin (Newson 1997). These early civilizations developed structured management systems based not on advanced science, but on the basis of trial and error (Newson 1997). The primary objective of water resource development of these early river basin civilizations was water distribution.

As the following overview illustrates, the objectives guiding the development and management of water resources during the last two centuries in the United States are considerably more complex. These objectives are historically contingent on changing environmental conditions, water resource use demands, institutional frameworks, technological advances and social values. Kenney (1997) provides a constructive delineation of the six historical intergovernmental and bureaucratic periods of water resource management in the United States: (1) early history (pre-1890); (2) the Progressive Conservation era (1890-1920s); (3) the Depression era (1929-1942); (4) the era of the basin interagency committee (1943-1960s); (5) the Cooperative Federalism era (1960s-1980); and (6) the modern or devolution era (1980s-present). These six periods are perhaps useful for analytical purposes, but such discrete temporal distinctions rarely exist empirically, especially given that institutional and bureaucratic change tends to occur incrementally. Nevertheless, organizing the material into these six time periods should provide the reader with an understanding of the major historical trends in water resource management.

A. Early History (pre-1890)

Water resources development during the Early History period in Eastern states was primarily concerned with improving navigation of major river systems via the construction of canals (Kenney 1997). The initial focus on navigation was reflected in the Treaty of Paris in 1763, the Northwest Ordinance of 1787, and the Commerce Clause of the Constitution (Dworsky, Allee, North 1991). The dominant Federal role in water resources development was reinforced given that the scope of most navigation projects proved to be beyond the fiscal and technical means of privately-funded efforts (Kenney 1997). At the time, the sole source of engineering expertise was at the nation's only engineering school at West Point (Feldman 1991; Kenney 1997). Congress created the U.S. Army Corps of Engineers, an agency staffed by army engineers trained at West Point, charged with the responsibility of constructing large-scale civilian projects (Feldman 1991) – such as, improving navigation on the Ohio and Mississippi Rivers during the 1820s (Kenney 1997). This early reliance on military expertise, perhaps necessary at the time, "retarded a fuller appreciation of the social, economic, and environmental impacts of water resources development" (Feldman 1991:9).

The Louisiana Purchase in 1803 opened the "Interior" to exploration, beginning with Lewis and Clark's three year expedition, which included studies of river basins to assist settlers moving West and to guard against the hazards of nature (Newson 1997).

Water resource development in the West included a strong Federal presence, a legal and political legacy inherited from resource development in the East (Kenney 1997). Of particular note, an important distinction exists regarding the law and water use. Eastern states adopted the common law of "riparian rights," where owners of land abutting streams and lakes have a coequal right to make reasonable use of surface water (Feldman 1991; McGregor 1994; Miller 1998; Spulber and Sabbaghi 1998). This doctrine has worked fairly well in the East where a relative abundance of water existed (Feldman 1991; Newson 1997). In the arid and semiarid West, where water was (and is) scarce, states have adopted the doctrine of "prior appropriation." This doctrine draws on the notion of "first come, first served" (Feldman 1991; McGregor 1994; Miller 1998), which contends that subsequent water users cannot infringe on the water quantity and quality appropriated by antecedent users (Spulber and Sabbaghi 1998).

As the first water resources development agency, the Corps of Engineers continued to grow during this period (Kenney 1997; Spulber and Sabbaghi 1998). In describing the competition between civilian and military engineers (and, more provocatively, between James Eads and Andrew Humphreys) to improve navigation on the Mississippi River, Barry (1997) captures the "man versus nature" ethos that personified this era. The Corps of Engineers' dogged emphasis on navigation impeded the later transition toward multipurpose water resource development (Kenney 1997). Although the Corps of Engineers did focus resource development on large river systems (mostly projects to improve navigation and, to a lesser degree, flood control), the 'river basin' as a management unit did not emerge until the Progressive Conservation era. With the exception of state-level canal building from 1815 to 1860, water resource development largely has been a federal pursuit (Dworsky *et al.* 1991).

B. Progressive Conservation Era (1890-1920s)

Few have matched the overall contribution of John Wesley Powell to water resources management. Powell's legacy is still unfolding as many of his ideas have found new life in the current philosophy of water resources management. Counter to the scientific reductionism of the day, "Powell understood in the 1870's not only the geological, but also the political and social significance of a watershed: that area of land, a bounded hydrological system, within which all living things are inextricable linked by their common water course and where, as humans settled, simple logic demanded that they become part of the 'community'" (Brown 1997a:1). Powell mapped the water resources of the West at the end of the nineteenth century, proposing to Congress that state boundaries in the West should correspond to watersheds rather than politically-defined state lines (Adler 1995; Brown 1997a; Kenney 1997; McGinnis et al. 1999).

Although Congress was not swayed by some of Powell's more radical (at least at the time) proposals, such as self-governing institutions called "hydrographic districts" (Kenney 1997), many of his ideas informed the philosophy and practice of natural resource management that followed. His ideas laid the groundwork for the adoption (in theory) of a comprehensive, integrated watershed approach (Adler1995), a management focus on hydrologically-defined systems (Kenney 1997), and the recognition of the need to balance the multiple uses of water through planning (Margerum 1997). These three interrelated, management strategies constitute, in part, the mission of a water resource model called Unified River Basin Management, and later Integrated River Basin Management (Margerum 1997).

Under the administration of Theodore Roosevelt, a number of commissions – Inland Waterways Commission of 1908, National Conservation Commission of 1909, and the National Waterways Commission of 1912 – produced proposals that further developed the idea of integrated river basin management (Adler 1995; Dworsky et al. 1991). Not surprisingly given the era, these proposals did not advocate comprehensive management of river basins for purposes of watershed protection and restoration, but rather to improve navigation, irrigation, flood control, and hydropower generation (Adler 1995). Congress failed to act on a single integrated river basin proposal partially due to interagency competition between Corps of Engineers, Bureau of Reclamation, and the Federal Power Commission (Adler 1995).

Nearly a decade after these early commissions, integrated river basin management was operationalized as a management practice. The interstate Colorado River Compact of 1922 was signed by seven states and later ratified by the Boulder Canyon Project Act of 1928 (Kenney 1997; Margerum 1997). This regional experimentation was extended to the national level with the adoption of the Rivers and Harbors Act of 1927. The major outcome of this act was the "308 plans," which were detailed multipurpose plans created by the Corps of Engineers for every major river basin in the nation (Adler 1995; Margerum 1997; Spulber and Sabbaghi 1998).

Multiple purposes, at the time, were interpreted as river basin management for the purposes of flood control, irrigation, hydroelectric power, and navigation (Kenney 1997; Margerum 1997). These approaches to comprehensive management proved to be quite popular given that "[I]n the 50 years following the negotiation of the Colorado River Compact, 18 other western rivers were apportioned via the interstate compact process and at least 500 multiple-purpose projects were built" (Kenney 1997:A-18). Although these approaches continued to rely on structural engineering solutions to water resource problems, such solutions were increasing understood within the context of whole river basins, rather than in isolation (Adler 1995).

Of particular note, water resource planners of this era were ahead of their time, as they "were among the first natural resources managers to recognize the issue of cross-boundary problems – namely, the incongruence between watershed and political boundaries" (Margerum 1997:460). More specifically, the Colorado River Compact of 1922 and the Boulder Canyon Project Act of 1928 set the stage for river basin studies and development projects. Three principles underlie the river basin model: (1) multiple-use water storage projects; (2) a basin-wide approach to river management, and (3) comprehensive regional development which in included the acceptance of state intervention in the promotion of social welfare (Margerum 1997). Related to these principles, the river basin model also advocated linking land and water management, guided by a unified administration (Margerum 1997; Wengert 1981). Certainly, the Colorado River Compact and the Boulder Canyon Project Act informed subsequent attempts at river basin management, but it was the creation of the Tennessee Valley Authority in the next era that legitimized the river basin model as an institutional form.

C. The Depression Era (1929-1942)

Carried over from the Progressive Conservation era, managing water resources at the river basin-level and the creation of multipurpose water projects became the fundamental tenets of water development philosophy and practice for many years to come (Kenney 1997). With the national economy reeling from the impact of the Great Depression, Franklin Roosevelt strongly advocated federally planned, basin-wide water resources development as the basis for regional economic development (Goldfarb 1994). This economic development strategy was broadly reflected in the National Industrial Recover Act of 1933 (Kenney 1997) and more fully specified in proposals by a series of short-lived organizations – the National Planning Board (1933-34), the National Resources Board (1934-35), the National Resources Committee (1935-39), and the National Resources Planning Board (1939-1943) (Adler 1995; Anderson 1999; Spulber and Sabbaghi 1998).

The structural grandeur of this era, arguably the apex of engineered solutions, is most strikingly recorded in the construction of large-scale dams – such as, the Hoover, Shasta, Bonneville, and Grand Coulee Dams (Kenney 1997). The magnitude and rate of dam building during this period were also symbolic of the public's optimistic view of science, technology, and scientists as objective experts (Feldman 1991). By the late 1930s, however, the importance of large-scale dam building faded from national consciousness as World War II moved to center stage (Kenney 1997). The comprehensive multipurpose river basin proposals of Depression Era, despite strong administrative support, were rejected by Congress, with one notable exception (Adler 1995).

The Tennessee Valley Authority (TVA), created in 1933, is an exemplar of comprehensive river basin management and has been the lasting legacy of Franklin Roosevelt's New Deal accomplishments. The legislative roots of the TVA Act lie with George W. Norris's first (April 1922) of six controversial bills regarding a stretch of the Tennessee River near Muscle Shoals, Alabama (Lowitt 1983). The Roosevelt Administration subsequently expanded Norris's vision by including Muscle Shoals in the comprehensive development of the Tennessee Valley River System (Conkin 1983). The TVA Act of 1933 has at least four main purposes:

> To improve the navigability and to provide for the flood control of the Tennessee River; to provide for reforestation and the proper use of marginal lands in the Tennessee Valley; to provide for the agricultural and industrial development of said valley; to provide for the national defense by the creation of a corporation for the operation of Government properties at and near Muscle Shoals in the State of Alabama, and for other purposes. (U.S. Congress 1933).

The TVA, along with the Army Corps of Engineers, the Bureau of Reclamation, and the U.S. Soil Conservation Service, is one of four federal agencies authorized to build or manage water control structures (Clarke and McCool 1996). The TVA, however, is unique for a number of reasons. First, TVA institutionalizes three tenets prominent in antecedent river basin proposals: the management unit corresponds with the entire river basin, water resources development and land use patterns are integrated, and water resources are developed for multiple purposes (Kenney 1997). Second, the broad objectives of TVA include responsibilities traditionally met by existing federal agencies. For example, within the Tennessee Valley, TVA is responsible for

> . . . dam construction, a function that traditionally had been vested in the Corps of Engineers and the Bureau of Reclamation; agricultural programs that traditionally had been a function of the Department of Agriculture; and conservation programs that traditionally had been a function of the Department of Interior (McCarthy 1982:699).

Third, TVA's institutional structure was (and is) unique and, despite the introduction and rejection of many bills calling for valley authorities for other river basins, it largely stands alone as a river basin experiment in the United States (Kenney 1997). The TVA, as Roosevelt described to Congress, was a new agency characterized as "a corporation clothed with the power of government, but possessed of the flexibility and initiative of private enterprise" (as quoted in Colignon 1997:112). On one hand, TVA was renowned for its history of rapid dam construction and a consistent utilitarian focus on economic development; on the other hand, TVA surprisingly lacks much in policy guidance or statutory mandates, thus conferring much discretion to TVA's three presidentially-appointed directors (Adler 1995). This discretion, depending on one's perspective and historical vantage point, has served as both bridges and barriers to TVA's ability to adapt institutionally to changing environmental conditions and societal values (Adler 1995). Freeman (1982) refers to TVA's early years as a period of "creation and turmoil" when economic expansion was established as the first priority, but without forsaking the goal of conservation (p.688).

Although some may trivialize TVA by viewing it as an anomalous experiment whose enactment was contingent on a particular historical context, TVA did institutionalize previous river basin proposals and legitimized the concerted efforts of many social planners, antimonopolists, and water resource scientists. The TVA's widespread popularity during the Depression Era is unquestioned. And, despite a controversial history, a lasting legacy of TVA as a water resource agency is its management focus on the river basin. Given the hydrological unity of the river basin, some suggest that it makes sense to have centralized water management agencies affiliated with each river basin (Spulber and Sabbaghi 1998).

Another important piece of legislation that was enacted during Depression Era was the Soil Conservation Act of 1935. This Act created the Soil Conservation Service (SCS) which in 1994 became the Natural Resources and Conservation Service, within the Department of Agriculture (Clark and McCool 1996; Kenney 1997). Due to overlapping mandates with existing powerful federal agencies (Corps of Engineers, Forest Service, and Bureau of Reclamation), the SCS narrowed its mission in the field to providing small-scale services for farmers in an effort to lessen the impact of soil erosion (Clark and McCool 1996). The Department of Agriculture prepared a standardized state conservation law, the law was enacted by state legislatures, and specific soil conservation districts were formed by local referenda (Clark and McCool 1996).

Aspects of the SCS's demonstration projects and the soil conservation districts anticipated, especially in comparison to the other federal agencies, many of the objectives of the contemporary watershed management approach. The SCS integrated land use and water resource issues on a small-scale, promoted intergovernmental cooperation (although turf wars still occurred), created private-public partnerships, and encouraged an interdisciplinary approach to prevent soil erosion (Kenney 1997). Additionally, SCS provided an example of a relatively successful "bottom-up" management approach where local individuals directly participated in local water resource issues (Anderson 1999). Despite these innovations, much of SCS's history was characterized by its subordinate position relative to the other federal agencies (Clark and McCool 1996).

D. The Era of the Basin Interagency Committee (1943 - 1960s)

Just as water resources development is partially responsible for national economic recovery during the Depression Era, "additional water development was seen in the post-World War II era as necessary to fuel the rise of the United States to superpower status" (Kenney 1997:5). Even though strong bureaucratic pressure and Congressional opposition to centralized planning prevented the creation of valley authorities other than TVA (Kenney 1997), the Truman and Eisenhower Administrations continued to promote multipurpose river basin management (Adler 1995; Dworsky et al. 1991). Administrative efforts toward this end were reflected in Truman's Water Resources Policy Commission Report and Eisenhower's Presidential Advisory Commission on Water Resources policy (Adler 1995). Consistent with preceding eras, these proposals were rejected by Congress (Adler 1995). As a result, administrative commitment to river basin management in a contentious bureaucratic climate resulted in the creation of flexible, informal interagency committees (Kenney 1997), a less powerful and autonomous institutional arrangement than the earlier proposed valley authorities.

The creation of the Federal Interagency River Basins Committee (FIARBC) in 1950 stemmed from the efforts of six federal agencies – initially, the Army Chief of Engineers, the Commissioner of Reclamation, and the Department of Agriculture, and later, the Federal Power Commission, the Department of Commerce, and the Federal Security Agency (Kenney 1997; Spulber and Sabbaghi 1998). Additionally, five regional interagency committees (referred to as the "firebrick" committees) were established for the Missouri, Columbia, Pacific Southwest, Arkansas-White-Red, and New York-New England basins (Adler 1995; Dworsky et al. 1991; Kenney 1997).

The FIARBC and the regional "firebrick" committees failed to implement river basin plans largely due to limited authority and weak coordination with state and local governments (Adler 1995; Kenney 1997). State participation, however, was relatively significant in the New York-New England basin (Foster 1984). Since proposals by the firebrick committees had to be approved by Congress, projects were subject to the vagaries of "pork-barrel"politics and the "iron triangle" (the nebulous interconnections between interest groups, agencies, and congressional committees). The FIARBC, the firebrick committees, and the interagency coordination committees proved to be short-lived experiments (Kenney 1997). Filling the void, temporary interagency "coordinating committees" were established on an *ad hoc*, site-specific basis (Kenney 1997). Although river basin planning was not supported institutionally, the rhetoric of such planning was employed by federal agencies to justify structural projects (Reisner 1986). For instance, agencies (most notably, the Bureau of Reclamation) would couple unjustifiable hydroelectric power projects with justifiable noneconomic projects under the guise of unified river basin planning (Kenney 1997).

Efforts at river basin planning largely failed during this period, but TVA and SCS continued to fulfill and develop their respective mandates and missions. The TVA went through tremendous changes during this period as it entered the stage of "progress through bigness" (Freeman 1982:688). World War II created important new opportunities central to the expansion of TVA. The domestic war effort "strengthened TVA and helped justify it as a defense enterprise," but, more important historically, "it also reinforced the agency's growing emphasis upon its function as a power facility" (Grantham 1983:318). During the war years from 1940 to 1946, the power production capacity of TVA increased fivefold, from approximately 500,000 to 2.5 million kilowatts (Freeman 1982). The TVA had become the largest producer of electricity in the United States by the mid-1950s (Grantham 1983). Continued economic expansion in the Tennessee Valley required greater power production. The TVA began building coal-fired steam generating plants during the late-1950s which soon was producing approximately 75 percent of TVA's electrical power (Droze 1983).

During this period, one could argue that TVA was simply fulfilling its primary mandate to provide "cheap" power for an economically "backwards" region. Moreover, the technical success of the agency was undeniable: "The massive dams on the Tennessee and its tributaries had harnessed the river, largely solved the problem of the recurring, devastating floods in the Valley, and created a great inland waterway for commercial traffic and recreation" (Grantham 1983:319). However, the byproducts of "progress through bigness" included tremendous social and environmental costs, the ramifications of which have not been fully realized. Given the reluctance to raise power rates and the recognition that hydroelectric power would not meet regional needs, cheap power for consumers was maintained by externalizing the social and environmental costs of "carelessly strip-mined land, inadequate mine-safety standards, and the atmospheric pollutants emitted by massive fossil fuel combustion" (Freeman 1982:692). The TVA remained in this power production expansion mode into the early-1970s. Compared to TVA's pre-World War II years, conservation during this period was placed on the back burner (Freeman 1982).

Just as TVA continued to manage water resources at the river basin-level, albeit for economic development, the U.S. Social Conservation Service continued to implement projects at the watershed level. The SCS's "small watersheds program" established in 1954 encouraged collaboration between State agencies and local organizations and was supported by Federal technical and financial assistance (Kenney 1997). The small watershed program furthered SCS's advocacy of intergovernmental cooperation and extended an earlier focus on soil erosion and flood control to include fish and wildlife enhancement (Kenney 1997). The reason for SCS's emphasis on watersheds was driven less by a commitment to an ecosystem approach and more by a need to circumvent direct competition with other, more powerful federal agencies. Nonetheless, many of SCS's successes in the field informed the contemporary commitment to the watershed approach.

Unlike SCS, TVA's creation and mission did loosely reflect a commitment toward what later would be called a holistic, ecosystem-based, watershed approach. In practice, TVA's river basin approach and SCS's small watershed approach together support the contemporary ideal of managing ecosystems at multiple, nested scales. Of course, management at multiple scales should be integrated. A major difference between the two agencies is that TVA was an institutional expression of an ideological commitment to a systemic, integrated approach; whereas, the SCS emphasis on watersheds was a practical response to bureaucratic competition and survival, not an ideology.

E. The Cooperative Federalism Era (1960s - late 1980s)

The dismantled basin interagency committees of the preceding period did have an impact on reforms in the 1960s (Kenney 1997). The Senate Select Committee on Water Resources was created in 1959 (Adler 1995; Spulber and Sabbaghi 1998). For the first time, the creation of this committee represents congressional support for river basin planning (Adler 1995), perhaps in response to the recognition of water pollution as a national concern and the need for less Federal and more State participation in regional planning (Adler 1995; Kenney 1997). Earlier waves of river basin proposals espoused the rhetoric of increasing State participation, but few incentives existed to do so (Kenney 1997). Congressional and Administrative support for river basin planning culminated in the first national river basin legislation, the Water Resources Planning Act of 1965 (Adler 1995). The Water Resources Planning Act (WRPA) broadly states that:

> [I]t is hereby declared to be the policy of Congress to encourage the conservation, development, and utilization of water and related land resources of the United States on a comprehensive and coordinated basis by the Federal Government, States, localities and private enterprise with the cooperation of all affected Federal Agencies, States, local governments, individuals, corporations, business enterprises, and others concerned (42 U.S.C § 1962).

The Water Resource Council (WRC) was created by Title I of the WRPA. The President was authorized by Title II of the WRPA, upon State or WRC recommendation, to create river basin commissions (Adler 1995; Kenney 1997). Such commissions were formed for the following basins in the northern regions of the United States: Great Lakes, the Missouri River, the New England, the Ohio River, the Pacific Northwest, the Souris-Red-Rainy River, and the Upper Mississippi River Basins. The Title II Commissions failed to live up to the stated purpose of the WRPA in two areas of particular significance. First, although 'conservation' was a stated goal of the WRPA, the primary historical foci on water use and development continued unabated. Second, federal agency members of the commissions ultimately possessed all of the power, despite the fact that the WRPA adhered to 'cooperative federalism' which emphasized less federal control and more Federal-State cooperation (Adler 1995).

Some suggest that the Title II Commissions were doomed from the start because they were presented as 'regional institutions' (Newson 1997), a framework that struck a negative political chord ever since Congress rejected the proposed non-TVA authorities and since such authorities were castigated as a form of socialism. Others, such as the last WRC director, suggested that the commissions failed due to the unwillingness of federal agencies, states, and local government to transfer authority to a new political entity

(Adler 1995). Furthermore, these commissions did not adequately respond to the environmental movement of the 1960s and 1970s (Kenney 1997), a movement increasingly concerned with water management rather than development.

Concurrent with, and more enduring than, the Title II Commissions was the emergence of two river basin compacts – the Delaware River Basin Compact (DRBC) and the Susquehanna River Basin Compact (SRBC) (Kenney 1997; Newson 1997). Unlike the Title II Commissions, the compacts were able to make binding decisions and were self-sufficient enough to implement projects with little external assistance (Kenney 1997). The 1973 report of the National Water Commission (established by Congress in 1968) found the organizational structure of the DRBC and SRBC to be superior to the Title II Commissions.

Another piece of legislation, the National Environmental Policy Act (NEPA) of 1969, had a major impact on regional water management (Kenney 1997). Under NEPA, federal agencies must prepare an Environmental Impact Statement (EIS) for each major federal project in which the impacts of the project on water pollution, wildlife, land use, wetlands' protection, and flood control are described in detail (McGregor 1994; Spyke 1999). The objectives of NEPA, although unintentionally, reinforced two central tenets of river basin proposals that had been accepted in principle since the turn of the century. First, NEPA encouraged interagency collaboration (Adler 1995; Keiter 1990). The NEPA, to some degree, legitimized and provided legal standing for interagency and intergovernmental collaboration and for river basin-wide approaches that had been circumvented historically due to Congressional politics and bureaucratic turf wars.

Second, since the EIS process requires resource managers to consider the cumulative impacts of all land use actions (Adler 1995), NEPA indirectly encouraged federal agencies to view river basins and watersheds systemically.

The regulatory system prescribed by the Federal Water Pollution Control Act (FWPCA) of 1948 focussed on interstate or navigable waters, relying on "state-developed ambient water quality standards" (Findley and Farber 1996:130). The Federal Water Pollution Control Act Amendments (FWPCAA) of 1972 reflected Congressional frustration with the inability of earlier legislation to improve water quality (Anderson 1999). The Amendments was a fairly radical departure from past regulatory efforts (Findley and Farber 1996; Wolman 1988). The FWPCA, administered by the Environmental Protection Agency (EPA), "seeks to eliminate discharges of pollutants into navigable waters, with an interim goal to achieve water that is both 'swimmable' and 'fishable'" (McGregor 1994:21). The idea behind the FWPCAA, the Clean Water Act of 1977 (CWA), and subsequent legislative approaches to pollution control, is that the private sector is responsible for pollution prevention and the public sector is responsible for the treatment of pollution (Spulber and Sabbaghi 1998). The CWA firmly placed water quality and quantity issues in the hands of states (MacKenzie 1996).

The FWPCAA and the CWA changed the course of water management in a number of different ways. First, the management focus was expanded to include regional pollution control, rather than just water resources development (Adler 1995; Kenney 1997). Second, the CWA included language that strongly reflected an ecosystem-based perspective – for instance, one of its objectives is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (as quoted in Adler 1995:1038). Patrick (1992) supports this claim by suggesting that the goal of "fishable" waters indirectly conveys the perspective that a river be managed as a system. Third, the FWPCAA embodied a 'cooperative federalism' orientation, since most states shouldered a prominent role in implementing and enforcing federally approved standards (Kenney 1997). The subsequent amendments to the CWA – especially Sections 208, 319, and 401 – have proven pivotal in efforts to address the problem of nonpoint source pollution and the implementation of the watershed approach.

TVA also went through profound changes during the Cooperative Federalism Era. As mentioned earlier, TVA's "progress through growth" stage (Freeman 1982:692) continued unabated until the early-1970s. The TVA continued to build coal-fired steam generating plants, but also began the construction of nuclear plants (Droze 1983). The TVA became the nation's largest coal consumer during the 1970s and operated power plants that emitted more than 2.4 million tons of sulfur dioxide per year (Freeman 1982). Between 1966 and 1969, TVA constructed more nuclear plants than any other utility in the nation and built the single largest nuclear facility in the world (Droze 1983). Furthermore, TVA became the world's largest nuclear power operation (Grantham 1983). Clearly, TVA was still in the growth mode. Yet, a number of important events occurred during the 1960s and 1970s that would chart TVA's course in subsequent years.

From World War II to 1959, multipurpose, large-scale dam construction and land purchases was curtailed as TVA was preoccupied with building coal-fired steam plants, confronting antagonistic private power interests, and dealing with an Eisenhower

Administration committed to small-scale, citizen-based water projects (Wheeler and McDonald 1986). In 1959, at a meeting referred to as the Watts Bar Conference, General Manager Aubrey Wagner presented his vision of TVA's return to the broader, multipurpose mission of the industrial development of the valley via the construction of more dams and reservoirs on the tributaries of the Tennessee River (Wheeler and McDonald 1986). The Tellico Dam project was conceived as the paragon of Wagner's new vision and as the catalyst for the rejuvenation of TVA. The historical significance of this controversial project for TVA is reflected in the claim that "[p]re-Tellico TVA and post-Tellico TVA were radically different entities" (Wheeler and McDonald 1986:218).

Certainly, TVA's pre-Tellico projects were met by resistance, but the opposition was typically fragmented, fleeting, and thus easily subdued by TVA (Wheeler and McDonald 1986). In the case of the Tellico Project, TVA attempted to minimize the effectiveness and likelihood of potential opposition in a number of ways. For instance, TVA evaded questions about whether a decision had been made to build the dam, downplayed the amount of land needed for the project, and undermined the potential for powerful opposition by encouraging the creation of somewhat pro-Tellico, semi-private citizen groups (Wheeler and McDonald 1986). Despite such efforts, TVA's dogmatic 'business as usual' approach proved surprisingly outdated and vulnerable given the political and cultural climate of the late-1960s and 1970s.

More specifically, Wheeler and MacDonald (1986) describe the political climate revolving around the Tellico Project which helps explain the relative success of the opposition.

> [T]he nation had become concerned with the environment, and it was only natural that environmentalists would scrutinize projects like Tellico closely. Environmentalists attacks on the project not only revived the spirits of anti-Tellico landowners, sportsmen, and farmers, but also added numerous upper-middle-class men and women to the opposition. These people new how to organize, how to pressure politicians, how to deal with the media, how to marshal public opinion, and how to use the judicial structure. (p. 125)

Not only was the Tellico Project confronted by an emboldened, multifaceted opposition, but it also faced judicial constraints introduced by a new era of environmental legislation. The Tellico Project served as a political and legal testing ground for two new pieces of environmental legislation.

The National Environmental Policy Act (NEPA) of 1969 requires that agencies submit an Environmental Impact Statement (EIS) assessing the cumulative impacts of a proposed project, such as Tellico Dam, on the environment (McGregor 1994; Spyke 1999; Wheeler and McDonald 1986). A lawsuit was jointly filed in 1970 by the Environmental Defense Fund, Trout Unlimited, and local citizens charging that TVA had not formally filed an official EIS, thus violating the requirements of NEPA (Rivkin 1983; Wheeler and McDonald 1986). The TVA claimed that it was not required to file an EIS because the early phases of the Tellico Project predated the passage of NEPA (Plater 1982; Rivkin 1983; Wheeler and McDonald 1986), and that as a federal corporation (not a federal agency) it was exempt (Plater 1982). The U.S. District Court, disagreeing with TVA's claims, issued an injunction halting the construction of the dam; the injunction subsequently was upheld by the Sixth Circuit Court of Appeals (Wheeler and McDonald 1986). The Court rescinded the injunction in 1973 upon TVA's completion of an official

EIS (Plater 1982; Wheeler and McDonald 1986). Although considered a blow to the opposition, the EIS requirement of NEPA effectively delayed dam construction through litigation for three years (Plater 1982).

Unlike the Endangered Species Act (ESA) of 1966 and the Amendments of 1969, the Amendments of 1973 had strong enforcement provisions, enabling citizens "to sue federal agencies which threatened any species listed by the Secretary of the Interior as endangered" (Wheeler and McDonald 1986:188). The ESA's power had not been fully utilized until employed by the opponents to again halt the construction of the Tellico Project (Clarke and McCool 1996). A diminutive minnow, the Snail Darter, was discovered in the Little Tennessee River in 1973 and later placed on the endangered species list (Smith 1995; Wheeler and McDonald 1986). The TVA, using a familiar tactic, claimed that the Tellico Project was exempt since project initiation preceded the passage of the ESA (Wheeler and McDonald 1986). This counter strategy, along with others, did not succeed. The Court found that dam completion would destroy the only known snail darter habitat, a clear violation of the ESA (Findley and Farber 1996; Smith 1995). Ultimately, TVA took the case to the Supreme Court and lost (Rivkin 1983). The project could not be completed unless the Congress exempted it from the ESA (Wheeler and McDonald 1986).

It seemed that the opposition had won: ". . .[A]fter over twenty years of planning, roughly fifteen years of opposition, ten years of on-and-off construction . . . and the expenditure of over $116 million, the Tellico Dam lay in the country-side like a beached whale, unable to move forward and unable to return to the sea" (Wheeler and McDonald

1986:202). Yet, anticlimactically, a rider attached to the annual public works appropriation bill was passed by Congress in 1979 which exempted the Tellico Project from the ESA (Rivkin 1983; Smith 1995; Wheeler and McDonald 1986). The project was completed in 1980.

The Tellico Project magnified TVA's dogmatic adherence to its historic mission and exposed a rigid policy making process that was detached from changing environmental conditions, values, and politics (Plater 1982). The old TVA faded with the completion of the Tellico Project because ". . . the real-life force of higher energy capacity costs, lowered demand, energy conservation economics, water resource accounting reforms, and increased activism among ratepayers and resource defenders meant that the old administrative dominance could not continue" (Plater 1982:776). For the first time, TVA's authority was being effectively challenged by three forces during the 1970s – citizens, states, and other federal agencies.

First, as outlined earlier, citizens challenged TVA by halting the construction of Tellico Dam on two separate occasions through litigation. Second, the state of Tennessee confronted TVA when Governor Winfield Dunn stressed that for social and environmental reasons the Tellico Dam should be discontinued (Rivkin 1983). Kentucky, in 1973, filed suit charging that TVA had to comply, as stated in Section 118 of the Clean Air Act (CAA), with the Kentucky Air Pollution Commission's plan for reducing air pollution (Rivkin 1983). Although ultimately unsuccessful, these two TVA-State confrontations were manifest of a broader trend, the changing state-federal relationship in which federal agencies were beginning to lose some sovereign immunity. As an indirect outcome of Kentucky's lawsuit, the 1977 amendments to Section 118 of the CAA required that federal agencies comply with the sometimes stricter, state-determined air pollution standards (McGregor 1994; Rivkin 1983). Third, when Congress created the Environmental Protection Agency (EPA) in 1970, "TVA's overriding goal of providing low-cost electricity collided with the federal government's commitment to pollution control" (Rivkin 1983:211).

The TVA's ardent and inflexible response to challenges to its authority during the 1970s hardly reflects the philosophy of "cooperative federalism." In fact, TVA's experience might be better characterized as "court-ordered cooperative federalism." These are the characteristics of the old TVA and bureaucracies can change, albeit slowly, especially when crippled by litigation. The transition from the old to the new TVA was most poignantly personified by the retirement of Chairman Aubrey Wagner and the 1977 confirmation of S. David Freeman as a director (Wheeler and McDonald 1986). Wheeler and McDonald (1986) state that although "both were men of vision . . . Wagner's was a vision of power plants, factories, and progress, whereas Freeman's was a vision more attuned to the energy-conscious 1970s" (p. 218).

F. The Modern or Devolution Era (late 1980s - present)

In the 1980s, the states' rights philosophy of New Federalism began to supplant Cooperative Federalism and restructure the state-federal relationship (Kenney 1997). The Reagan administration, a strong advocate of New Federalism, promptly "dissolved the established [Title II] Federal/State River Basin Commissions, the office of the Federal

Water Resources Council, [and] the program of grants to support state water planning tasks . . ." (Dworsky et al. 1991:480; Kenney 1997). As with earlier, less formal basin-wide institutions, the Title II Commissions were sufficient at state-federal information exchange, but lacked the authority to make enforceable decisions (Kenney 1997). The organizational structure of the Title II Commissions reflected the mission of a bygone era; a federally-driven mission centered on water resources development, not management (Newson 1997).

The transition from "cooperative federalism" to "new federalism" represented the devolution of water resources management responsibilities from the federal-level to the state- and substate-levels (MacKenzie 1996). Dworsky *et al.* (1991) suggest that underlying devolution is not a philosophical shift in management strategies, but rather the simple fact that large-scale, federal water projects had run their course and were no longer useful. Most of the major federal water projects were completed or deauthorized by 1990 (Goldfarb 1994). The states and local governments in the modern era are the primary agents responsible for water development, planning, and management (Dworsky et al. 1991; Light and Wodraska 1990; Nakamura and Born 1993), leaving the federal government ". . . floundering to define its role and mission" (Light and Wodraska 1990:482).

The most notable exception to the trend of substate water resources management is the interstate Northwest Power Planning Council (NWPPC), created by the Northwest Power Act (NPA) of 1980 (Lee 1993). The primary purpose of the NPA is twofold: first, to devise an energy plan that ensures the continued production of inexpensive hydroelectricity and, second, to reverse the precipitous decline of the region's anadromous fishery (Kenney 1997). The NPA explicitly addresses the impact of dam construction and development and watershed health in the Columbia River watershed (Adler 1995). Given the political climate of devolution, the NWPPC serves as an exemplar of an effective regional interstate compact (Kenney 1997) – especially when considering the council's ability to build accountability, implement an effective participatory process, and encourage a consensus through active negotiation (Lee 1993). Adler (1995) adds that the NPA "constitutes the nation's most ambitious and inspiring experiment in comprehensive watershed management and protection" (p. 1079). The NWPPC and the NPA were good examples of the States' rights philosophy of New Federalism (Kenney 1997).

Certainly, the 1980s was not the "golden age" of environmental legislation. Nonetheless, core environmental acts were reauthorized and amended, despite the attacks on environmentalism. During this era, clean water became a major public concern and water resource managers began to focus on water quality and sources of pollution. The passage of the Federal Water Pollution Control Act Amendments (FWPCAA) of 1972 reflected congressional frustration with the failure of prior efforts to improve water quality (Anderson 1999). The primary focus of the FWPCAA was pollution stemming from point sources (Pratt and McNitt 1998), which are easily identified because they usually come out of a "pipe" (e.g., sewage treatment plants, large injection wells, industrial plants, livestock facilities, landfills, and others). Regulated by state water quality agencies and the EPA, point sources are issued a National Pollutant Discharge

Elimination System (NPDES) permit when they meet regulations. The NPDES has been successful over the years in regulating pollution from point sources (Pratt and McNitt 1998).

Regulating point source pollution amounts to picking – again, to invoke Haeuber's (1996) metaphor – the "low-hanging fruit" of water pollution. Despite some success, 40 percent of the nation's assessed waters were deemed too polluted for basic uses, such as fishing and swimming (Pratt and McNitt 1998). The culprit is nonpoint source pollution, caused by such activities as agricultural runoff, urban runoff, poor logging practices, and road construction. One of the most formidable challenges for water resource managers today is to control nonpoint sources of water pollution.

Congress, beginning with the FWPCAA of 1972, recognized nonpoint source pollution as a problem and delegated the responsibility of controlling it to states and local governments (Goldfarb 1994). Anderson (1999) argues that the CWA failed, since "both section 319 of the nonpoint source pollution grant program and its predecessor, section 208, suffer from limited funding and lack of state participation" and, equally important, "EPA has no authority to force states to adopt nonpoint source pollution plans" (p. 358). Section 319, however, was slightly more aggressive than Section 208, requiring the stricter, Best Management Practices (BMPs) for nonpoint source pollution (Adler 1995; Anderson 1999). Section 302 of the 1993 Senate Clean Water Act reauthorization bill (S.1114) revived Section 208, but ultimately suffered from the same limitations (Goldfarb 1994).

The traditional command and control framework is unable to effectively regulate nonpoint source pollution which is diffuse and difficult to measure; thus, making it is impossible to pinpoint responsibility (Goldfarb 1994). Given the inability of the CWA to mitigate the impact of nonpoint source pollution on water quality and watershed health, some have argued that the adoption of watershed management is a necessary alternative (Adler 1995; Anderson 1999; Goldfarb 1994). The EPA's Watershed Protection Approach, first proposed in 1991, focuses on "three elements: 1) risk-based targeting of focus watersheds; 2) participation by all affected and interested stakeholders; and 3) integrated solutions established by stakeholder consensus" (Goldfarb 1994:501). After outlining and assessing four recent watershed management proposals, Goldfarb (1994) suggests that EPA's proposal is superior to the others because it is ". . . consensus-based, bottom-up, inside-out, problem shed-based, [and] individualized" (p. 501).

Complementary to EPA's Watershed Protection Approach, the Clinton Administration presented the Clean Water Initiative (CWI) in 1998 (Anderson 1999). The CWI has four central objectives: first, to advocate a unified, intergovernmental effort to identify threatened watersheds that need restoration and pristine watersheds that need protection; second, to stimulate collaborative efforts among citizens, local communities, and federal agencies to develop restoration plans that will bring watersheds up to clean water standards; third, to promote pollution prevention; and fourth, to increase funding for small grants (Section 319) that will support local efforts in protecting and restoring watersheds (Anderson 1999). Like EPA's proposal, the CWI is conceived as a bottom-up, consensus-based process with input from local stakeholders (Anderson 1999). Watershed management has gained much momentum as the prevailing approach to water resources management.

Since TVA's authority was successfully challenged from the late-1970s to the early-1980s and as the "old guard" began to retire, the new TVA has taken a less combative stance in the modern era. As one author notes, TVA's new stance was quite different from that of the past.

> [B]y 1982, TVA had reversed itself so dramatically that environmental organizations pointed to its clean-up effort as a model for other utilities. The same agency that had received bad marks for noncompliance with NEPA standards under Aubrey Wagner would, under S. David Freeman's direction, become an environmental bellwether (Rivkin1983:218).

However, TVA, like other federal resource agencies, must operate in an era of devolution. Unlike other federal resource agencies, TVA must also address the pending privatisation of its power program.

G. Conclusion

From the above literature review, it is possible to distill at least three trends that seem of particular importance given the likely water resource problems of the 21st Century. First, the current structure of water resources management, and natural resource management more generally, is an outcome of a historically-specific, fragmented and incremental method of addressing natural resource problems (MacKenzie 1996). As new problems arose, Congress would enact laws to address these problems, delegating responsibility to existing or new agencies (Dworsky et al. 1991). The lack of interagency coordination and the inefficiency stemming from this ad hoc, piece meal method is cogently illustrated by Palmer (1986):

> Twenty-five government agencies now spend $10 billion a year on water but they do not work in unison. The Department of Agriculture drains wetlands while the Fish and Wildlife Service of the Department of the Interior tries to preserve them. The Bureau of Reclamation in the Department of Interior irrigates new farmland while the Department of Agriculture pays farmers to leave the land idle. The Fish and Wildlife Service tries to halt channelization while the Federal Emergency Management Administration pays for bulldozers to plough through streams in attempts to push gravel away after floods. (as quoted in Newson 1997:124).

Palmer's (1986) statement reflects fragmentation only at the federal level. The complexity of water resources management becomes that much more evident when we consider that an "estimated 100,000 water-related entities" exist on the local level and that "states have over 300 departments having water and water-related resource functions" (Goldfarb 1994:485).

In addition to interagency fragmentation, management responsibility for different, but hydrologically interconnected, aspects of water issues – such as, water quality, water supply, surface water, and groundwater – have also been fragmented and treated as separate issues (MacKenzie 1996). The current knowledge of the dynamic interconnections among resource media within a watershed and the interaction between watersheds is incongruent with the fragmented structure of agencies responsible for water resources management. Consequently, a holistic watershed management that embraces the hydrological cycle must reconnect and integrate the issues of water quality, water quantity, surface water and groundwater. This is a daunting task, given the history of water resources development and management (MacKenzie 1996), a task that perhaps cannot be met through incremental change.

Second, a paradox exists between the trend of devolution and the principle that watersheds should be managed at multiple, hierarchically nested scales. On one hand, by transferring power to states and local government, devolution has potentially enabled watershed management to occur effectively at smaller scales and to implement a bottom-up approach. On the other hand, the systemic characteristics of watershed management necessitate that management occurs at larger scales, such as the river basin level. Watershed management's emphasis on management at multiple scales evokes the tension between choosing a bottom-up, decentralized approach *or* a top-down, centralized approach to decision making. Watershed management, however, advocates and requires the iterative implementation of both approaches.

More concretely, the trend of devolution makes "winners" and "losers" out of existing agencies and programs. For instance, the Soil and Conservation Service's (now the Natural Resources and Conservation Service) "small watersheds program" is politically popular because it anticipated, and is consistent with, some of the principles of ecosystem-based approaches. Regional institutions, however, like the Northwest Power Planning Council (NWPPC) and TVA, are likely threatened, if current trends continue, by devolution and privatization. If watershed management is going to be effective in addressing contemporary water resource problems it must advocate for institutional representation at multiple scales, even though this counters the trend of devolution.

Third, the history of water resources management in the United States can be characterized as a transition from a sole focus on water resources development – such as, flood control, navigation, and power production – to a broader focus on watershed management that includes watershed protection and restoration. Additionally, the related problems of declining water quality, degradation of watershed health, and threatened aquatic and terrestrial species had moved water pollution to center stage during the 1960s and 1970s. The persistence of these same problems, despite the relatively effective regulation of point source pollution, has moved nonpoint source pollution to center stage in the 1980s and 1990s, and into the 21st Century. The inability to regulate nonpoint source pollution is critical and is the practical impetus behind the agreed-upon need for new water resources management approaches. As such, the relative success or failure of the watershed approach, as that new strategy, hinges on its ability to effectively control nonpoint source pollution, which includes expanding the role the public plays in resource management decision making.

III. The Watershed Approach

The new thinking on water resources management by academics, agencies, and resource managers is referred to as "watershed management" or the "watershed approach." The watershed approach is one form of what we earlier referred to as an ecosystem-based approach and is the focus of much recent research (e.g., Adler 1995; Anderson 1999; EPA 1996; Golden 1998; Goldfarb 1994; Johnson 1998; Lewis and Slider 1999; McGinnis et al. 1999; Michaels 1999; Montgomery et al. 1995; Pratt and

McNitt 1998). The systemic and collaborative principles of the watershed approach can be traced to the philosophy of "unified river basin management" (Goldfarb 1994), a historically influential philosophy first advocated by John Wesley Powell in 1879 (MacKenzie 1996). Watershed management adopts the comprehensive and coordinated approach of unified river basin management, but broadens the focus on development to include aquatic health and water quality (Goldfarb 1994).

Well articulated and strongly supported by the Environmental Protection Agency (EPA), the watershed approach is the key component of the EPA's Clean Water Action Plan. As defined by the EPA, the watershed approach is a "coordinating framework for environmental management that focuses public and private efforts to address the highest priority problems within hydrologically-defined geographic areas, taking into consideration both ground and surface water flow" (EPA 1996). The main premise of the watershed approach is that many water quality and ecosystem problems are best solved at a holistic, watershed-level rather than at the individual waterbody- or discharger-level. More specifically, in contrast to water resources development, the watershed approach strongly advocates interagency collaboration, more explicitly relates land use patterns to aquatic health and water quality, manages entire watersheds rather than riparian corridors, more rigorously addresses the impact of nonpoint source pollution, expands the focus of management to include private land as well as public land, and includes citizens as coequal partners in watershed management decisions.

The watershed approach seems to be gaining momentum as the primary approach to managing natural resources. At least eighteen federal agencies have adopted the watershed management approach (Cortner and Moote 1999; McGinnis et al. 1999; Montgomery et al. 1995). Additionally, as part of President Clinton's Clean Water Action Plan of 1998, the Departments of the Interior (DOI) and Agriculture (USDA) presented a proposal, titled Unified Federal Policy to Ensure a Watershed Approach to Federal Land and Resource Management (Federal Register Feb.22, 2000). This proposal seeks to develop a unified policy on watershed management in consultation with other Federal agencies, States, Tribes, and interested stakeholders. The final policy will be adopted by the Environmental Protection Agency, the Tennessee Valley Authority, the Army Corps of Engineers, and the Departments of Agriculture, Commerce, Defense, Energy, and the Interior. Some have argued that the watershed approach, with its focus on watersheds as the unit of analysis, is a more rigorous and practical approach to addressing contemporary environmental problems than other ecosystem-based approaches (Adler 1995; Johnson and Campbell 1991; McGinnis 1999; Wallin 1996).

This claim is supported by a number of characteristics of the watershed approach and watersheds. First, and perhaps foremost, the watershed approach simplifies the complex problems associated with defining and choosing the appropriate geographic scale(s) of management. The second principle or objective of ecosystem management is to better understand the complexity of systems by examining the interconnectedness of contiguous scales and nested scales (Grumbine 1997; Haeuber 1996; Slocombe 1993). The focus of the watershed approach on watersheds as the unit or scale of management is advantageous for a number of reasons: "(a) they [watersheds] are meaningful ecologically; (b) they are defined spatially; [and] (c) they can be nested hierarchically, in that small watersheds are part of larger watersheds" (McGinnis 1999:498). In fact, watersheds at different scales have already been defined in the United States. The United States Geological Survey has divided the country into successively smaller hydrologic units based on surface topography (USGS 2000). Four nested levels of classification have been defined ranging from largest to smallest: regions (21 units), subregions (222 units), accounting units (352 units), and cataloging units (2150 units) (USGS 2000).

Second, current ecological conditions provide support for the management at the level of watersheds, since aquatic species and aquatic-based ecosystems are more threatened than their terrestrial counterparts (Adler 1995). For instance, "73% of mussels, 65% of crayfishes, 34% of fishes, and 28% of amphibians are jeopardized, compared to 13% of mammals, 11% of birds, and 14% of reptiles" (Adler 1995; 988). The decline in the health of aquatic species and ecosystems is rapid (EPA 1992). The main point is that the health of aquatic systems is a good measure of (or surrogate for) the health of the watershed as a whole, which includes all species and ecosystems therein (McGinnis 1999). Brown (1997a) suggests that watershed management is an effective approach to saving endangered species because their survival is contingent on the health of the watershed as a whole. This holistic perspective is reflected in the Endangered Species Act of 1972, as it requires the protection of entire habitats in which endangered species live (Nash 1989; Sax 1997). Protecting species on a case-by-case level is perhaps a necessary form of triage, but this approach must be supplemented by the watershed approach – a proactive strategy that, if effective, should prevent more species from becoming endangered.

Third, central to ecosystem-based approaches is the argument that citizen participation is necessary for the effective management of natural resources. The participatory success of the watershed approach may hinge on "the idea that people are more willing to take actions and to make sacrifices to protect and restore a special *place* . . . than to promote some abstract idea of environmental quality" (Adler 1995, p. 1000). People are more likely to participate if the issue at hand concerns something they care about. Water quality is unrivalled as an environmental concern (Wallin 1996) and thus citizens should be quick to mobilize to address critical watershed issues. Additionally, with perhaps the notable exception of ecosystems defined by the habitat of some culturally-embedded or symbolic species, ecosystems defined by particular water systems – such as, streams, rivers, lakes, and bays – are more likely to constitute a special place. Thus, mobilizing citizens to participate in management of ecosystems defined by watersheds will be more successful than ecosystems defined by other boundaries.

The claim that watersheds provide a sense of place for communities is supported by the proliferation of grassroots watershed coalitions, community river restoration projects, and the bioregional movement (Adler 1995). The bioregional movement is committed to ecological restoration and the adoption of watershed-based protection (McGinnis et al. 1999). Adler (1995) contends that bioregionalism supports watershed management in two significant ways: first, "organizing efforts around bioregions defined by watersheds . . . can provide the regional identity needed to overcome political parochialism" (p. 1002) and second, "harnessing bioregionalism may be useful in transforming the nation's theoretical but largely unrealized conservation ethic into changes in the behavior of individuals within their own watersheds" (p.1003).

CHAPTER THREE

CITIZEN PARTICIPATION IN NATURAL RESOURCE MANAGEMENT: MACRO AND MICRO CONSIDERATIONS

I. Introduction

The general focus of Chapter Three is an examination of the trend of increased citizen participation in governmental decision-making processes. More narrowly, we distinguish between two types of citizen participation ('NEPA-driven' and 'collaborative' participation) and then discuss the role that both types of participation have played in natural resource management. Ideally, collaborative participation increases citizen input at all stages of the decision making process. Given this ideal, two important questions structure this chapter. The first question is what are the factors that explain why governmental agencies are opening up their decision-making processes to increased citizen involvement? Based on extensive literature reviews drawn from multiple fields of inquiry, we develop the argument that widespread and representative citizen participation is necessary for political economic and natural resource science reasons. From the vantage point of political economy, we suggest that the recent trend of promoting public participation in environmental decision-making partially reflects an attempt by natural resource agencies to regain citizen trust and institutional legitimacy.

From a resource science perspective, this research contends that the problem-solving strategies of traditional natural resource management were perhaps adequate when scientific reductionism was viewed as the only legitimate epistemology, resources were managed only for consumptive uses, and the regulatory focus was on point sources of pollution. However, in an era when multiple epistemologies are valued, citizens demand the management of resources for non-consumptive uses, and the problems of nonpoint source pollution is recognized, the problem-solving strategy of post-normal science is required. Post-normal science hinges on the formation of an "extended peer community" in which discourse occurs among all stakeholders impacted by a problem. The emergence of citizen-led, collaborative decision-making teams, such as watershed coalitions, in natural resource management are viewed as extended peer communities, and as necessary to lessen the impact of nonpoint source pollution. The political economic and scientific basis of increased citizen participation are theoretically and conceptually developed in this research, but are not operationalized.

The second question is if given the opportunity to participate, what are the bridges and barriers to get more citizens involved in governmental decision-making in general and, more specifically, in natural resource management? At the micro-level, we hypothesize that certain political attitudes (political efficacy and trust in government) and environmental values (ecological worldview) are important in determining the likelihood of citizens participating when the opportunity arises. Although much of this research is exploratory, this chapter closes with an outline of hypotheses that guide the analyses presented in Chapter Five and Six.

II. Political-Economic Basis of Increased Citizen Participation

The structural difficulties that plague liberal democratic societies stem from the inherent contradictions between the tenets of liberalism and democracy (Cable and Benson 1992; Cable and Cable 1995; Habermas 1973; Marshall 1999; O'Connor 1973; Wolfe 1977). The historical underpinnings of liberal democratic societies, according to Wolfe (1977), are rooted in two differing political traditions – liberalism and democracy. Liberalism, originating in Enlightenment thought, emerged and developed in the 17th, 18th, and 19th centuries as a free market ideology that justified capitalism as the increasingly dominant mode of production (Wolfe 1977). Liberal policies are defined as "those that attempt to facilitate the accumulation of capital by removing traditional encumbrances to the market in labor power, encouraging a conception of man based on self-interest, and creating a government structure that facilitates control over the system by those with ability in economic affairs rather than social standing" (Wolfe 1977:4).

The second political tradition underpinning liberal democratic society is democracy. Democracy as an idea and a practice originated in Greek city-states during the fifth century BC. At the time, democracy simply meant 'rule by the people.' This form of democracy, with high levels of citizen participation in decision-making, approximated what we would today call direct or participatory democracy. Also central to the meaning of democracy is the notion that people should have equal rights before the law and equal opportunity to participate in politics. Thus, the traditional twin pillars of democracy have been equality and participation.

Manifest in the contradictory dual functions that governments are expected to fulfill in modern liberal democracies are the inherent contradictions of liberalism and democracy. More specifically, O'Connor's (1973) 'fiscal crisis of the state' thesis contends that "the capitalist state must fulfill two basic and often conflicting functions -- accumulation and legitimization" (p. 6). Conditions conducive to capital accumulation are advanced via the accumulation function of the state because failure to do so undermines "the source of its own power, the taxes drawn from the economy's surplus production" (O'Connor 1973:6). Conversely, the flagrant use of coercive force that enables one class to accumulate capital at the expense of other classes attenuates the legitimacy of the state, undermining the basis of its political support. Pressure on the state to fulfill its accumulation function is pervasive, especially considering the argument that society is on a "treadmill of production" (Schnaiberg 1980), involving the perpetually growing needs of capital investment and profitability that require increasing inputs of energy and material.

Concomitant with the maturation of global capitalism is the relative increase in power of transnational corporations and the decrease in power of governments within nation-states (Marshall 1999; Robinson 1996).[3] As a result of this power shift, the state's

[3] The globalization of the economic system has intensified the fiscal crisis of the state (Marshall 1999). A defining feature of a truly global economy is a function of two interrelated processes. First, the pervasiveness of the capitalist mode of production disables and replaces all pre-capitalist relations across the globe. The second process is the "transition from national and regional economies structurally linked on a global scale via commodity exchange and capital flow to the globalization of the process of production itself" (Marshall 1999:257; see also, Robinson 1996; 1998). I suggest that the emergence and predominance of global capitalism have exacerbated the inherent

ability to fulfill its legitimacy function is attenuated, as it is less able to regulate economic activity within national boundaries, to capture and redistribute surpluses, and to impose regulations on polluting corporations. At the same time, the state has fulfilled its accumulation function by creating conditions favorable for capital accumulation through corporate subsidies, tax breaks, and by dismantling environmental regulation. Deregulation – or, at best, discretionary enforcement of existing environmental regulations, especially in rural areas (Schnaiberg 1986) – has allowed corporations to externalize the environmental costs of pollution (Cable and Cable 1995; Marshall 1999). Thus, the public indirectly subsidizes the polluting corporation by either withstanding the costs of living in a degraded environment or paying for the cleanup of the environment (Cable and Cable 1995).[4]

As certain segments of the population disproportionately face material deprivation and environmental degradation, the government's failure to fulfill its legitimacy function is revealed, resulting in a legitimation crisis. This revelation by an already apathetic citizenry has increased the distrust of governmental agencies. Citizens come to view particular agencies as 'recreant'– that is, they perceive that institutional

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contradictions between liberalism and democracy and generated a legitimation crisis for the state. The relative increase in power of transnational corporations has pressured liberal democratic states to adopt neoliberal policies, creating conditions conducive for capital accumulation.

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In a similar vein, Garrett Hardin (1993) discusses the CC-PP game, where costs are commonized (everyone pays for them) and profits are privatized (funneled into the hands of corporations). This game is harmful from a distributional standpoint; CC-PP is faulted for lack of equity and justice.

actors have failed to carry out their responsibilities with the vigour necessary to merit the societal trust they covet (Freudenberg 1993). Another source of recreancy occurs when the regulatory process is subverted through 'agency capture'- when "a regulatory agency comes to hold views more similar to the industry it is supposed to be regulating than the public it is supposed to protect" (Gramling and Krogman 1997:21; see also, Freudenberg and Gramling 1994). We suggest that recreant behavior by agencies and growing citizen distrust of agencies are grounded expressions of the government's legitimation crisis. The characteristics of these grounded expressions are not monolithic, but are contextualized by the agency involved, the impacted community, and the relationship between the two.

How has the state responded to this crisis? How does the state attempt to fulfill its legitimation function in an era of powerful transnational corporations, vast inequalities, and a distrustful and apathetic citizenry? We suggest, along with others, that the recent general trend of promoting more public participation in environmental decision-making partially reflects an attempt by natural resource agencies to regain citizen trust and institutional legitimacy (Cupps 1977; Rosener 1982; Thomas 1990; Tuler and Webler 1999). In turn, the willingness of citizens to participate with governmental agencies in environmental decision-making is partially a function of their trust in government and degree of political efficacy. There is a renewed emphasis on public participation in environmental decision-making. For instance, advocates of sustainable development, ecological modernization, and ecosystem-based approaches to natural resource management all argue for greater public participation in all phases of environmental decision-making. This section has argued that agencies have increased citizen participation to rebuild citizen trust and institutional legitimacy. Another reason for increasing citizen participation is that it is necessary to effectively manage natural resources.

III. Scientific Basis of Increased Citizen Participation

We argue that as scientific strategies employed to extract, manage, protect, and restore natural resources have changed, so too have public perceptions of government and governmental agencies responsible for natural resource management. The paragraphs that follow delineate the relationships between participation, scientific strategies, and trust in government. The necessity and emergence of "post-normal science" (Funtowics and Ravetz 1992) corresponds with the transition from traditional natural resource management to ecosystem-based approaches, from water resource development to watershed management, and from inauthentic participation to authentic participation. Funtowics and Ravetz's model illustrates, from the perspective of science, the increased necessity of citizen participation in natural resource management. More specifically, consensus-building, bottom-up, participatory models of decision-making – including the extended peer community and ecosystem-based approaches – are representative of post-normal scientific strategies designed to lessen the impact of post-normal problems. We suggest that the ecosystem-based approaches represent post-normal scientific strategies that are both proactive and preventive.

Funtowics and Ravetz (1992) provide a useful framework for examining the changing relationship between environmental problems and scientific strategies used to address those problems. The authors make the distinction between three different types of problem-solving strategies: applied science, professional consultancy, and post-normal science. In the author's framework, the horizontal axis moves outward, from low to high systems uncertainty. The authors draw a distinction between three levels of systems uncertainty. First, problems can be solved at the 'technical' level when uncertainty is managed via the standard routines of applied science. Second, the skills and personal judgements of professional consultants are required to solve a 'methodological' problem of uncertainty, typically a debate about values or reliability. Third, when the problem modifies the question by asking wether or not uncertainty is manageable (or the uncertainty of uncertainty), solutions are required at the 'epistemological' level.

The vertical axis of the framework moves upward, from low to high decision stakes. Decision stakes are understood as the costs and benefits of various policy decisions for all parties that are impacted by the issue at hand. Applied science is an adequate strategy when systems uncertainty and decision stakes are low. When systems uncertainty and decision stakes are medium, professional consultancy is necessary and may supplement applied science. Applied science and professional consultancy together form what is commonly known as traditional science. Finally, the strategy of post-normal science is needed when systems uncertainty and decision stakes are high. The necessity of using one of the three strategies for problem-solving does not preclude the necessity of using the others. In fact, some complex problems may require the use of all three strategies.

A. Traditional Science

The first problem-solving strategy identified by Funtowics and Ravetz (1992) is 'applied science' or in Kuhn's (1970) parlance, 'puzzle-solving.' Applied science adheres to the canons of science advocated since the 17th century. Thus, applied science is based on a reductionistic, linear, and mechanistic model of the empirical world. Applied science produces objective knowledge through scientific expertise and discounts the public as non-experts and lay knowledge as value-laden. The development of traditional natural resource management was also based on the applied science model and was shaped by the utilitarianism of the industrial era (Holling et al. 1998).

Scientists publicly opted for a role of value neutrality. Moreover, the public generally supported scientists' claims of expertise and the belief that science was a superior knowledge system with canons of proof producing findings untainted by personality, politics, and commercialism. Legitimate human knowledge was built largely on trust in expert systems located in institutions. Beginning in World War II and building steam in the 1950s, applied science blurred the distinction between 'scientific validity' and 'engineering feasibility,' which resulted in the unleashing of unanticipated environmental risks (Funtowics and Ravetz 1992). The emergence of unanticipated environmental problems pointed to the inadequacy of applied science and thus the necessity of alternative problem solving strategies.

‘Professional consultancy,’ although ancient in occupations such as a physician, entered the public decision making arena in the United States in response to post-normal accidents – such as, Love Canal, Three Mile Island, Times Beach, and Bhopal. These technological disasters exposed the fallibility and inadequacy of applied science and created the conditions conducive for the emergence of the strategy of professional consultancy (Funtowics and Ravetz 1992). A key difference between the applied scientist and the professional is that “the [applied] scientists’ task is completed when he has solved a problem that in principle can function as a contribution to a body of knowledge, the professional’s task involves the welfare of a client, and the science that is deployed for that is subsidiary to that goal” (Funtowics and Ravetz 1992:256).

Given the historical evidence of natural resource agencies captured by extractive industries, one could argue that a professional consultancy strategy has been employed by natural resource agencies since their infancy, albeit under the guise of applied science. Another example is the Tellico Dam project debacle. Both TVA and the loyal opposition had scientists producing significantly different benefit-cost analyses that supported their respective claims. The Tellico Dam project also illustrates how dam building, typically a problem of traditional science, emerged into a post-normal problem most notably characterized by a decade’s worth of citizen activism, competing scientific claims, and legal disputes. In such contentious situations, faith in science is undermined as scientific truth becomes overtly politicized and trust in governmental agencies is lessened.

In short, professional consultancy exposed science for being a value-laden process, operating in an arena with multiple stakeholders, each armed with professionals making truth claims backed by science. Thus, critics of traditional science argued that scientists were not objective, research may be politicized, and large scale research shops have become financially tied to commercial interests. As a result, confidence in institutions responsible for risk regulation and management has eroded steadily over the past several decades (Dunlap and Mertig 1992; Lipset and Schneider 1983). A number of studies provide evidence of a relationship between trust in institutions and levels of expressed environmental concern (Freudenberg 1993; Hoban, Woodrum, and Czaja 1992; Marshall 1995; Slovic 1992). For instance, Freudenberg (1993) shows that concern about the potential siting of a low-level nuclear waste facility and a high-level nuclear waste repository increases when government is viewed as 'recreant.' Marshall (1995) found that levels of concern for environmental pollution was greater for citizens with less confidence in local government.

Ulrich Beck (1992) presents a thesis that further explicates the tendency of citizens to question the exalted status of traditional science. For instance, Beck's (1992) idea of the 'demystification of science' illustrates the trend that people no longer blindly accept the truth claims and objectivity of traditional science. Beck (1992) argues that the history of the growing consciousness and social recognition of (post-normal) environmental risks coincide with the history of the demystification of the (traditional) sciences. Counter to post-modern claims, many have suggested that the method of (traditional) science is not being forsaken, but rather the method of science and scientific terminology is being divorced from the institution itself (Beck 1992; Brown 1997b; 1992; 1987; Kroll-Smith and Floyd 1997). The usefulness of traditional science to solve some problems is not questioned; what is questioned is its status as the only legitimate problem-solving strategy and as a strategy that must be employed by experts. Citizens themselves have become lay scientists in environmental risk areas that are salient to them.

Kroll-Smith and Floyd (1997) provide an excellent example of the notion of the lay scientist. They found that individuals afflicted with environmental illness, by adopting biomedical terminology, were able to shift the source of the problem from themselves, as victims, to the chemical environment. By redefining environmental illness, the afflicted were able to persuade government officials to change public policies accommodating their illness, despite the medical profession's continued refusal to legitimize the affliction. The process Phil Brown calls 'popular epidemiology' (Brown 1997b; 1992; 1987) is another excellent example of the growing legitimacy of claims by lay scientists. More specifically, popular epidemiology documents the process by which the lay public translates their situated understanding of the relationship of illness and environmental insults into the more universal and accepted language of science.

Funtowics and Ravetz (1992) suggest that "just as industrial risk assessment exposed the inadequacy of the *applied science* approach, so the newer risk problems, either global environment on the one hand, or toxics on the other, show the need for a form of practice that both includes and goes beyond applied science and professional consultancy" (p. 258). One potential source of citizen distrust of government and loss of institutional legitimacy may stem from the inability of traditional scientific strategies to address post-normal environmental risks, or problems that Kai Erikson (1994) refers to as a 'new species of trouble.' The inadequacy of traditional science in the face of post-normal accidents is captured succinctly by Beverly Paigen (as quoted in Brown 1997b), a geneticist who worked with victims of Love Canal:

> Before Love Canal, I also needed a 95 percent certainty before I was convinced of a result. But seeing this rigorously applied in a situation where the consequences of an error meant that pregnancies were resulting in miscarriages, stillbirths, and children with medical problems, I realized I was making a value judgment . . . whether to make errors on the side of protecting human health or on the side of conserving state resources (p. 16).

Given the ineffectiveness of traditional science in addressing modern environmental problems, it is not surprising that new problem-solving strategies are needed.

B. Post-Normal Science

Problems that require "post-normal science are ones where, typically, facts are uncertain, values in dispute, stakes high, and decisions urgent" (Funtowics and Ravetz 1992:254). Post-normal science as a strategy hinges on the formation of an "extended peer community" in which a dialogue occurs among all stakeholders impacted by a problem. In such a participatory arena, science is but one of many sources of evidence, which together inform decisions made by the extended peer community (Funtowics and Ravetz 1992). The necessity of an extended peer community becomes apparent when it is recognized that science is value-laden and that many contemporary problems are characterized by high degrees of uncertainty,

Funtowics and Ravetz (1992) note that traditional science still has utility, "but when the responsible experts are unable to produce . . . an epidemiology that identifies environmentally caused illnesses without protracted political and legal struggles, then by default we are in the realm of post-normal science, and we need an extension of the peer community for the exercise of quality assurance" (p. 267). Clearly, the protracted social, political and legal struggles that follow a technological disaster, the siting of locally undesirable land uses (LULUs), and claims of environmental injustice have dramatically increased the decision stakes of environmental decision-making. These post-normal problems have created contested situations in which citizens express their frustration through grass-roots mobilization. In a sense, the grassroots environmental movement may be viewed as a reactionary response to the inability of traditional science to solve post-normal environmental problems. Perhaps consensus-building, bottom-up, participatory models of decision-making represent post-normal scientific strategies designed to lessen the impact of post-normal problems. As such, we suggest that ecosystem-based approaches represent post-normal scientific strategies that are both proactive and preventive.

In sum, the applied science strategy managed the problems of uncertainty through experimental control in a laboratory setting or by relying on statistical probabilities. The professional consultancy strategy managed the problems of uncertainty through the skilled judgment of professionals and insurance. The problem of uncertainty for post-normal science is of a different sort. The critical question is not how do we manage uncertainty, but rather how do we make better decisions in a world of unmanageable uncertainties. We shift from making decisions guided by traditional science, which assumes that everything is knowable via the scientific method, to making decisions through post-normal science, which attempts to find solutions through multiple epistemologies but recognizing that not everything is knowable.

Funtowics and Ravetz's (1992) discussion of post-normal science, extended peer communities, and the need to incorporate local knowledge in solving scientific and technological problems provide the scientific basis for citizen participation in environmental decision-making. They also suggest that extended peer communities may be necessary to develop sustainable communities and decreasing citizen alienation and distrust. As suggested earlier, we contend that roughly parallelling the emergence of post-normal science as a scientific strategy, is the transition from limited inauthentic participation to increased authentic participation.

IV. Participation in Natural Resource Management

Participation has been a predominant and reappearing theme in American political thought. Some argue that political change in the United States can be understood as a series of historical adaptations to demands from the public for greater participation (Fiorino 1989). Expanding opportunities for citizens to participate "can strengthen society by assuring that the actions of government are embedded in society, rather than imposed on society" (Thomas 1995:7). Citizen participation takes many forms and has many different definitions. Yet, most generally, citizen participation is any "purposeful activity in which citizens take part in relation to government" (Langton 1978:17).

The transition toward greater grassroots citizen participation in environmental policy is partially influenced by a larger 'reinventing government' movement, in which agencies have recognized the limitations of top-down regulatory models of environmental protection (Weber 1999). While there is general agreement on the need for more public participation in decision-making, the most appropriate form for this participation is typically unspecified (Tuler and Webler 1999). In this research, we make the distinction about whether or not, and to what degree, public participation in decision-making is 'authentic' or 'inauthentic,' arguing that the former is necessary for ecosystem-based approaches to succeed.

With a focus on both process and outcome, authentic participation means that citizen stakeholders are a part of the deliberation process, from issue framing to the end of the process (King, Feltey, and Susel 1998). Participation is authentic when the public has a genuine opportunity to influence decision-making at all stages of the process. Inauthentic participation occurs when public input is solicited, but the agency never intends to use the input. Why would an agency encourage participation when they plan to overlook public input when making decisions? One answer is that an agency is simply fulfilling a statutory or legislative mandate. Another answer is that an agency may promote authentic participation on the surface to regain legitimacy and trust, but then follow predetermined policy preferences. If successful, the agency can fulfill its legitimacy function through symbolic activities while fulfilling its accumulation function through actual policy implementation. Institutional legitimacy is undermined when citizens realize that their supposedly authentic participation was never seriously considered by the agencies as inputs into the decision making process.

A. Traditional Natural Resource Management

The most common model of public participation, one that is criticized for being inauthentic, is the public 'hearing' or 'forum.' This form of participation was first institutionalized by the National Environmental Policy Act (NEPA) and has been the staple of traditional natural resource management. NEPA proclaims that "each person has a responsibility to contribute to the preservation and enhancement of the environment" (Spyke 1999:278). For instance, federal agencies must prepare an Environmental Impact Statement (EIS) for each major federal project in which the impacts of the project on water pollution, wildlife, land use, wetlands' protection, and flood control is described in detail (McGregor 1994; Spyke 1999). EISs must be published in the Federal Register for public review. The Council on Environment Quality (CEQ) was established under NEPA to carry out the functions of the statute. CEQ regulations stress public involvement in the implementation of NEPA through notice and comment procedures which are mandated in the NEPA process. The procedural requirements for public participation are enforced by federal courts and opponents can file suits to challenge NEPA decisions and EISs (McGregor 1994).

A weakness of this model of participation is that most agencies require only minimal public input in the Environmental Analysis (Spyke 1999), a preliminary report which determines if federal actions require a full EIS (McGregor 1994). Most federal actions do not require a full EIS. Thus, some argue that the Environmental Analysis is an alternative process to the EIS that enables agencies to circumvent full NEPA compliance, averting any meaningful public participation in the decision-making process (Spyke 1999). NEPA also requires interagency collaboration in the EIS process. Each federal agency must consult with and obtain the input from any other agencies – state, local, and federal – which have jurisdiction by law or special expertise with respect to any environmental impact involved in the project (McGregor 1994). Several tenets of ecosystem-based approaches adopted by state and federal agencies – such as, the commitment to public participation and interagency collaboration – were contained within NEPA from the beginning.

Despite NEPA's commitment to public involvement, critics note many problems: NEPA-related documents are overly technical; public involvement is sought *after* agency decisions have been made; and agencies do a poor job of locating appropriate stakeholders (CEQ 1997). Traditional public hearings are ineffective and adversarial because input is sought too late in the process, after issues have been framed and most decisions have been made (King et al. 1998; Hadden 1989). Hadden (1989) notes that only a very small portion of the population has an opportunity to speak at public hearings and that such hearings are primarily held to fulfill legal requirements rather than to stimulate authentic public input. Some argue that public hearings are not democratic because participants are better educated, more politically active, and more informed than nonparticipants (Godschalk and Stiftle 1981).

Additionally, public hearings tend to foster participation by interest groups while limiting participation by the general public (Cortner and Moote 1999), and other interests are typically muted by economic interests (Checkoway 1981; Checkoway and Van Til 1978; Godschalk and Stifle 1981). Low attendance at public hearings is often interpreted, by default, as support for the status quo or public apathy (Kathlene and Martin 1991). A different interpretation is plausible. If citizens presume that their input will not impact policy choices, what is the incentive to participate?

It is precisely because of these problems with traditional forms of participation mentioned above, coupled with broader trends of citizen apathy and distrust of government, that natural resource practitioners and researchers studying natural resource management has recognized the need for new management strategies. The role of citizen participation in these new ecosystem-based strategies is much greater and articulated as more authentic than in traditional strategies. The transition from traditional forms of citizen participation to participation in new management paradigms potentially involves a shift from inauthentic to authentic participation.

B. Ecosystem-Based Approaches

Another reason for agencies to adopt new participation strategies is that ecosystem-based approaches will likely fail without authentic participation. Ecosystem-based approaches are designed to promote greater stakeholder involvement in environmental decision-making, policy design, and implementation through interactive collaboration, open communication, shared leadership, and new partnerships. It provides local communities greater involvement in decisions that impact their community and allows a plethora of community concerns to be incorporated into decision-making about environmental issues. One particular ecosystem-based approach, the watershed approach, emerged as a strategy with the recognition that non-point source pollution is having a devastating impact on ecosystem health. Traditional regulatory models are ineffective at addressing non-point source pollution problems. To lessen the impact of non-point source pollution, citizens must collaborate and cooperate with each other to lessen their individual and collective impact on the environment.

The primary purpose of including citizens in watershed management is to improve the effectiveness of management. However, somewhat independent of management outcomes, secondary benefits may be accrued by participants and communities. For instance, authentic participation is a method of empowering communities (Fiorino 1989; Spyke 1999), creating community leaders (Spyke 1999), and redistributing power (Kweit and Kweit 1981). With community empowerment is a greater sense of individual efficacy as citizens begin to see their efforts as part of a greater whole. In short, authentic participation is thought to produce an engaged citizenry who may become a part of an extended peer community that not only manages extant post-normal problems, but also reduces the proliferation of new problems. Ecosystem-based approaches attempt to address the related post-normal problems of degraded ecosystems, declining biodiversity, and diffuse non-point source pollution.

For citizen participation to be effective, both citizen participants and resource managers must develop new understandings of their roles in decision-making. From in-depth interviews, King et al. (1998) depict the dilemmas that emerge when managers and citizens attempt to redefine their roles in environmental decision-making. While managers recognize the need for more citizen participation, they are unable to find ways to fit the public into decision-making processes. Although citizens agree that more participation is needed, they are cynical about the impact of their involvement, due to prior experiences with agencies requesting input merely for symbolic reasons.

In summary, this review allows us to distinguish between two types of participation in environmental decision-making. The first type we call 'NEPA-driven' participation which has been the typical form of participation used in traditional natural resource management. The predominant form of NEPA-driven participation is the public forum or meeting, but some agencies (e.g., TVA) use citizen surveys. According to the literature, NEPA-driven participation is characterized by one-way interaction from agency 'talking heads' to citizens, interests tend to be polarized between environmental protection and economic development, and organized interest groups are disproportionately represented. Agency participants tend to present themselves as experts.

The second type of participation is 'collaborative' participation which is the type advocated by ecosystem-based management approaches. Since this form of participation is relatively new to resource management, evidence assessing its effectiveness is limited. Ideally, collaborative participation should include two-way interactions between agencies and citizens, the expression of multiple interests, and input from 'average' citizens whose interests may not correspond with existing interest groups. The factors that determine an individual's willingness to participate in either a NEPA-driven process or a collaborative process is likely to be different.

V. The Social Psychology of Citizen Participation

At the macro-level, we explained the necessity (or perceived necessity) of increased citizen participation in governmental decision-making from political economic, scientific, and natural resource management perspectives. We suggested that by adopting more participatory forms of decision making, agencies are attempting to rebuild institutional legitimacy. Given greater opportunities to participate, the sections below ask the broader question of what values or attitudes partially determine whether or not someone is willing to participate in a decision-making process that is driven, or at least initiated, by a governmental agency? Additionally, what values or attitudes are important when the issue at hand is natural resource management? This section will provide some answers to these questions. We briefly review literature that situates attitudes and values in the broader context of theories about belief systems and schemas. Also, we hypothesize that people who possess certain political values (high political efficacy and trust in government) and environmental values (New Ecological Paradigm) are more likely to participate in environmental decision-making.

A. The Structure of the Belief System(s)

Much of the early research on the structure of belief systems can be traced to public opinion studies conducted during the 1950s and 1960s, a period when sophisticated survey research techniques became widely used. The substantive focus of much of this early research was political attitudes and behavior. Seminal research found that most Americans were appallingly short of political information and lacked the cognitive sophistication necessary to make considered choices based on policies and potential outcomes (Berelson, Lazarsfeld, and McPhee 1954; Campbell et al. 1960; Campbell, Gurin, and Miller 1954). This evidence supported what became the dominant paradigm – the minimalist paradigm – which endured up until the 1980s.

During the 1980s, the central question of public opinion research was that given that most political issues are not personally relevant or visible to most citizens, how is it possible for the ordinary citizen to figure out where he or she stands on such issues? Researchers attempting to answer this question searched in two different directions. Some hypothesized that public's opinions on specific issues are derived from a 'global world view;' others speculated that opinions are formed in response to 'domain-specific' cues (Iyengar 1991:7). Domain-specific approaches are narrow and idiosyncratic, suggesting that opinions are driven by more focused considerations of particular issues (Iyengar 1991). Global world view approaches assume that a single 'deeper-level' belief system exists which structures more peripheral elements, such as concrete attitudes and behaviors. This research seeks to specify structure of the belief system and to hierarchically link abstract values to concrete attitudes and behaviors.

Stern, Dietz, and Guagnano (1995:727) present a useful global worldview framework or "A Schematic Causal Model of Environmental Concern" that informs this research. Although the authors use the framework to address the issue domain of the environment, the components are generalizeable to other issue domains. The framework consists of six tiers with the following levels specified from the top or deepest tier to the most concrete tier: (1) position in the social structure, (2) values, (3) general beliefs, worldview, folk ecological theory, (4) specific beliefs and attitudes, (5) behavioral commitments and intentions, and (6) behavior.[5] Causal linkages are stronger from top to bottom, but reverse linkages or feedbacks are hypothesized to exist. The causal relationship between adjacent tiers are strongest, although nonadjacent tiers may have direct causal linkages.

The elusive goal of most public opinion research is to predict behavior. Attitudes have generally proven to be poor predictors of behavior. From Stern et al.'s (1995) model, it follows that the best predictors of behaviors are behavioral intentions. Given the difficulties of including behavioral measures in non-experimental, social scientific studies, some researchers use behavioral intentions as a surrogate measure of behavior. This methodological shortcut is less than ideal, as Vaske and Donnelly (1999) cite two studies which, through meta-analyses, find average behavioral intention-behavior correlations to be .53 and .62. Although these correlations are high, survey research should include measures of behavior if possible.

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Vaske and Donnelly (1999) present "The Cognitive Hierarchy Model of Human Behavior" that is structurally and conceptually similar to Stern *et al.*'s (1995) framework. Their model includes five tiers: values, value orientations, attitudes and norms, behavioral intentions, and behaviors. Although the authors do not situate NEP in their model, they do consider a biocentric/anthropocentric value continuum to be a "value orientation."

B. Political Attitudes and Values

The central question relevant to this research is what values or attitudes partially determine whether or not someone is willing to participate in a decision-making process that is driven, or at least initiated, by a governmental agency? We suggest that people who view a democratic government as legitimate are more likely to participate in governmental decision-making than those who feel government lacks legitimacy. Legitimacy is a form of political support. We will discuss two political attitudes, both of which measure some aspect of the broader concept of political legitimacy (Erikson, Luttbeg, and Tedin 1991). Items measuring the two political attitudes – political efficacy and trust in government – have been used in almost every biennial National Election Study (NES), conducted by the University of Michigan's Center for Political Studies, since the early 1950s.

Political efficacy, as originally formulated by Campbell *et al.* (1954), is defined as "the feeling that individual political action does have, or can have, an impact on the political process . . . the feeling that political and social change is possible, and that the individual citizen can play a part in bringing about this change" (p. 187). Although initially conceived as unidimensional, subsequent research demonstrated that the six NES questions used to measure political efficacy actually measure two dimensions – internal and external efficacy (Acock, Clarke, and Stewart 1985; Craig, Niemi, and Silver 1990). Accordingly, the concept was more fully specified and redefined.

Internal political efficacy is defined as "the perception that people can understand politics and competently participate in political activities"; external political efficacy is defined as "the belief that public officials and political institutions are responsive to citizen demands" (Acock and Clarke 1990:87). In this research, we decided to use the survey items that measure internal political efficacy for two reasons. First, research indicates that internal efficacy is more stable over time than external efficacy (Acock and Clarke 1990; Aish and Joreskog 1990) and thus, more likely to represent a persistent orientation. Second, limited anecdotal evidence indicates that internal efficacy will likely be a better predictor of local citizen participation than external efficacy.

Research has found cross-national evidence of the consistent relationship between particular sociodemographic variables and levels of political efficacy. For instance, evidence indicates that men (Almond and Verba 1963; Campbell et al. 1960; Campbell et al. 1954), older people (Almond and Verba 1963; Campbell et al. 1954; Milbrath and Goel 1977), and the well-educated and affluent (Almond and Verba 1963; Campbell et al. 1960; Campbell et al. 1954; Finkel 1987; Steinberger 1981) are more internally efficacious than their respective counterparts. Most of this research occurred in the late-1950s and 1960s. As such, these relationships, especially between gender and efficacy, may be less strong today. More importantly for this research, some studies have found evidence of a non-recursive relationship between high efficacy and increased levels of political participation (Finkel 1987; 1985; Pollock 1983). Carole Pateman (1970) concluded that more egalitarian forms of participation would improve one's sense of political efficacy.

Hayes and Bean (1993) concisely capture the significance of the relationship between political efficacy and democracy: "If democracy is to a large extent about public participation in the political process and elected governments responding to the demands of the citizenry, then the dual concepts of internal and external efficacy must occupy a central place in any theoretical or empirical study of democratic political systems" (p. 276). This claim is particularly apropos given the seemingly pervasive trend of moving toward more participatory models of governance. Earlier in this chapter, we argued from a number of vantage points that an institutional need exists for increased levels of citizen participation in governmental decision-making. The degree of participation partially will be determined by a person's level of political efficacy and sociodemographic characteristics.

The second political attitude is trust in government. Thomas (1998) suggests that trust in government should be viewed as existing on a continuum: "The more we calculate the intentions of others, expect something in return, and subsequently monitor their performance, the less we are exhibiting trust. Similarly, the more others take our interests into account, putting their own interests aside in the process, the more they are worthy of our trust" (p. 170).

During the 1960s and 1970s, democratic politics in the United States demonstrated resilience and did not buckle under periodic waves of political protest. While short-term outpourings of political dissatisfaction seem to be an inherent part of a healthy democracy, long-term public distrust may pose a real threat to the stability of a democratic regime. There is cause for concern. The public's trust in government has, on average, decreased in the United States since the 1960s (Lipset and Schneider 1983; Miller 1974). Although trust in government began to rise in 1982, reaching a minor peak in 1986, it subsequently declined during the 1990s, hitting its lowest point in 1994.[6] In fact, this decline is broader than simply the public's alienation from government. The decline in confidence in major institutions over the last thirty years is significant. From 1964 to 1995, confidence in universities dropped from 61 to 30 per cent; in major companies, from 55 to 21 per cent; in medicine, from 73 to 29 per cent; and from 29 to 14 percent for journalism (Nye, Zelikow, and King 1997). Cross-national evidence exhibits a similar overall pattern of declining trust in major institutions. What are the factors that explain the systemic decline of trust in government in the United States?

Some researchers argue that the decline in trust is partially determined by general dissatisfaction with governmental institutions (Miller 1974), the failure of administrative leaders (Mitchell and Scott 1987), and poor performance of elected officials (Citrin 1974; Citrin and Green 1986). Almond and Verba (1963) add that insufficient trust is particularly dangerous when the system is not performing in an adequate fashion. Clearly, it is a worthwhile exercise to identify the sociodemographic correlates of declining trust in government. But given the importance of trust for governmental stability, surprisingly few studies have focussed on ways to restore and maintain trust in government (LaPorte and Metlay 1996; Ruscio 1996; Thomas 1998). We argue that an individual's existing level of trust in government and political efficacy will partially determine the likelihood that he or she will participate in governmental decision-making.

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These figures were obtained from the web site of the National Election Study (NES), conducted by the University of Michigan's Center for Political Studies. Online: www.umich.edu/~nes/ nesguide/graphs/g5a_5_1.htm. Downloaded 2/7/00.

In turn, if they participate and such participation is treated authentically by agencies, then that individual's level of trust and efficacy should increase. Thus, authentic participation and increased levels of trust and efficacy reciprocally reinforce each other.

C. Environmental Values

This section narrows the research question by focussing specifically on the issue domain of natural resource management. We ask the question that given increased opportunities for citizen participation, what values or attitudes partially determine whether or not an individual is willing to participate in natural resource management? Does it make a difference that the decision-making process is driven, or at least initiated, by natural resource agencies? More succinctly, what is the relationship between environmental values and participation in decision-making regarding the environment?

Two 'global world view' approaches are particularly important to the domain of environmental values and attitudes. The first approach is the thesis of "post-materialist value change" presented by Ronald Ingelhart in a series of writings (1977, 1981, 1990, 1995a; 1995b; Ingelhart and Abramson 1994). Based on Maslow's hierarchy of needs theory, the argument is that a person's physiological and safety needs (materialist) must be met before higher order needs (post-materialist) becomes a priority (Gooch 1995). In brief, Ingelhart argues that individuals are increasingly concerned with the environment in affluent industrial societies because, through generational replacement, the value priorities of these societies are shifting from materialist to post-materialist goals. Two propositions are important to this thesis: first, that fulfillment of basic needs (Maslow) takes precedence over non-material needs, and second, that value systems are acquired in childhood and youth and remain relatively stable over time.

Ingelhart's thesis was severely undermined when Brechen and Kempton (1994) published research indicating that high levels of environmental concern are not unique to industrialized societies, but rather equally high or higher among individuals in developing societies. They conclude that sources of environmental concern are complex and not simply the byproduct of postmaterial value change. In a special edition of a 1997 *Social Science Quarterly*, a number of researchers either defend the Brechen and Kempton study (Brechen and Kempton 1997; Dunlap and Mertig 1997) or defend Ingelhart's thesis (Abramson 1997; Kidd and Lee 1997). Ingelhart defenders' explanation for high environmental concern in poor societies is the hypothesis that their concern is a function of the dire objective environmental conditions in which they live. Questioning the *post hoc* nature of this hypothesis, Dunlap and Mertig (1997) note that "objective environmental conditions . . . were notably absent in postmaterialist explanations of the emergence of environmentalism within industrial nations . . . " (p. 25). Despite a lengthy and rigorous legacy, Ingelhart's thesis appears to be losing its empirical import.

In the 1990s, we see the emergence of a number of empirical constructs that reflect an 'ecological world view' (Dunlap et al. 2000) For instance, some researchers have used survey items to measure a number of different constructs or dimensions, such as ecological consciousness (Ellis and Thompson 1997), anthropocentrism (Chandler and Dreger 1993), environmental ethics (Minteer and Manning 1999), anthropocentric/ecocentric (Thompson and Barton 1994), and anthropocentric/biocentric

(Shindler 1993; Vaske and Donnelly 1999). This array of constructs supports the often mentioned critique of the social sciences that for every researcher there is a new concept. An exception to this critique is the widely-used 'New Ecological Paradigm,' which has been widely used in a number of different studies in the United States and other nations.

As originally specified, the New Environmental Paradigm (NEP), later changed to the New Ecological Paradigm, consisted of three sets of four questions that measure the following beliefs: (1) humanity's ability to upset the balance of nature; (2) the existence of limits to growth for human societies; and (3) humanity's right to rule over the rest of nature (Dunlap and Van Liere 1978). Over the years, research employing the NEP has variously treated the construct as a measure of environmental concern, attitudes, beliefs, and values (Dunlap et al. 2000). Thus, the NEP has been specified as occupying different hierarchical levels that constitute the belief system. Noting this substantive ambiguity and drawing on the early work of Rokeach (1960; 1973), Dunlap *et al.* (2000) suggest that the appropriate view of the NEP scale is as a measure of 'primitive beliefs,' which "form the inner core of a person's belief system" (p. 4). Primitive beliefs are "deeply internalized" and "most determinative of behaviors" (Gray 1985:32).

Another important measurement issue is whether NEP measures one or multiple dimensions. Beliefs or attitudes in a complex issue domain such as, the environment, are not likely to underlie a single dimension (Gray 1985). Indeed, some researchers provide literature reviews of the dimensionality of the NEP (e.g., Bechtel, Verdugo, and Pinheiro 1999; Dunlap et al. 2000). Drawing on sub-national, national, and cross-national samples, studies have found that NEP measures two dimensions (Bechtel et al 1999; Gooch 1995; Noe and Snow 1990a; 1990b; Scott and Willits 1994), three dimensions (Albrecht et al. 1982; Bechtel et al. 1999; Edgell and Nowell 1989; Geller and Lasley 1985; Noe and Snow 1990a; 1990b; Shetzer, Stackman, and Moore 1991), and four dimensions (Furman 1998; see also, Kuhn and Jackson 1989, who used a modified scale).

Some research has explicitly explored the relationship between environmental attitudes and behaviors. For instance, a number of studies have found positive, albeit weak or moderate, relationships between support for the environment and pro-environmental behaviors (Borden and Schettino 1979; Dunlap and Van Liere 1978; Heberlein and Black 1976; Scott and Willits 1994; Thompson and Barton 1994; Van Liere and Dunlap 1981). Given this evidence, why is the relationship between environmental attitudes, such as the NEP scale, and behaviors weak or moderate? One possible answer is that the NEP scale, viewed as 'primitive beliefs,' and environmental behaviors are measured at different levels of generality (Fishbein and Ajzen 1975; Weigel 1985). Attitudes and behaviors measured at roughly the same level of generality should yield stronger relationships (Fishbein and Ajzen 1975; Weigel 1985).

Stern *et al.* (1995) found strong empirical support for NEP as a measure of a primitive belief, or in Stern et al.'s terms, 'folk ecological theory.' Given this evidence and Stern et al.'s (1995) framework, the weak or moderate direct effect of NEP on behavior is not surprising because separating NEP and behaviors are two tiers – 'specific beliefs' and 'behavioral intentions.' Only adjacent tiers are expected to be strongly related. An empirical test may find that NEP has a relatively strong indirect effect on environmental behaviors, via the mediating variables of specific beliefs and behavioral intentions.

VI. Hypotheses

The empirical basis of this research is best understood as an outcome of four stages. In the first stage, we speculate that the process of implementing the watershed approach in the NRW is impacted, on some level, by the social and biophysical context of the NRW. Furthermore, we suggest that the aggregate sociodemographic and attitudinal characteristics of the watershed residents provides an understanding of the social context of the NRW. Note that we are unable to provide a statistical test of this speculation, since we do not collect contextual data for the NRW over time or cross-sectional data from multiple contexts. Thus, we cannot make comparisons over time in one context or across contexts. Nonetheless, we suggest that data regarding the context of the NRW and evidence of situations in which watershed coalitions will provide useful information regarding the potential impact of contextual factors.

The second stage utilizes participant-observation data to assess the following: the impact that reorganization of TVA's nonpower programs has had on the ability of the CPWT to implement the watershed approach; the degree to which the CPWT was successful in promoting interagency collaboration and cooperation; and the success of interagency efforts to mobilize citizen participation in the watershed coalition. The first two stages of this research are more exploratory than confirmatory.

In the third stage, we merged the data from the watershed residents and NEPA participants surveys into a single database to address three important research questions. The first question is whether or not the people who participate in NEPA events are representative of the general population? Existing research indicates that the answer to this question is that NEPA participants typically are not representative. We use bivariate analyses to compare the sociodemographic and attitudinal characteristics of watershed residents and NEPA participants to assess the representativeness of participation in the NRW. We report the results for variables where the differences between NEPA participants and watershed residents are statistically significant. We hypothesize the significance of the following differences.

> *Hypothesis 1*: NEPA participants will be more educated than the watershed residents.
>
> *Hypothesis 2*: NEPA participants will have higher incomes than the watershed residents.
>
> *Hypothesis 3*: NEPA participants will have higher levels of political efficacy than the watershed residents.
>
> *Hypothesis 4*: NEPA participants will have higher levels of trust in government than the watershed residents.

The second question we address is to what degree are the watershed coalition participants representative of the watershed residents. Since the watershed coalition had not formed by July 2000, we are unable to directly answer this question. However, the survey of NEPA participants provides information about a small pool of individuals – a group we call "potential coalition members" – from which the CPWT is going to recruit watershed coalition participants. Ideally, participants in the watershed coalition should be representative of those who live in the watershed. Yet, given that the potential coalition members are a subset of the NEPA participants, we assume that the differences between the potential coalition members and the watershed residents will parallel the differences between the NEPA participants and the watershed residents. If the potential coalition members were not identified through the NEPA process, we would assume that the NEPA participants and the coalition members would be fundamentally different given the argument presented earlier in this chapter. Despite these issues, the actual watershed coalition will likely emerge and will be a subset of the potential coalition members. Therefore, it is important to know who they are. We determine the degree to which the "potential coalition participants" are representative of the watershed residents.

The third question we ask is what are the determinants of citizen participation? Citizen participation is operationalized as two dichotomous dependent variables (DVs) measuring the different forms of citizen participation – NEPA-driven participation and interest in being involved in a watershed coalition.[7] Logistic regression is used to test the hypotheses below. Logistic regression allows the prediction of a discrete outcome (e.g., nonparticipant/participant) from a set of variables. The four sub-hypotheses listed below (1a - 4a) essentially are more fully specified versions of the four bivariate relationships

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Note that the interest in a watershed coalition dependent variables is based on a different question than the one used to define the "potential coalition participants." The former question was asked on our two telephone surveys and is separate from CPWT's NEPA-driven projects. The latter was based on a question on TVA's Norris Lake Watershed Survey (NLWS).

presented above as hypotheses 1 - 4. The key difference is that the hypotheses 1 - 4 are tested via a bivariate analysis which allows an assessment of whether or not the variances in the two variables are significantly related. Sub-hypotheses 1a - 4a are tested through multivariate analyses which allows an assessment whether or not the four variables are significant predictors of NEPA participation, after other selected variables have been controlled. We hypothesize the following:

> *Sub-Hypothesis 1a*: Individuals with higher levels of education are more likely to have participated in NEPA events.
>
> *Sub-Hypothesis 2a*: Individuals with higher household incomes are more likely to have participated in NEPA events.
>
> *Sub-Hypothesis 3a*: Individuals with higher levels of political efficacy are more likely to have participated in NEPA events.
>
> *Sub-Hypothesis 4a*: Individuals with higher degrees of trust in government are more likely to have participated in NEPA events.
>
> *Hypothesis 5*: Individuals who express a more ecological worldview are more likely to have participated in NEPA events.
>
> *Hypothesis 6*: Individuals who more frequently use the public lands and waters are more likely to have participated in NEPA events.

Empirical evidence regarding what factors might be related to interest in a watershed coalition is limited. We do know that watershed coalitions tend to mobilize quickly when faced with an environmental crisis of some sort – such as, water scarcity, water pollution, or the endangerment of a culturally relevant species. Absent these crisis events, as is the case in the NRW, little is known regarding what factors are related to interest in a watershed coalition. In Chapter Two, we suggest that collaborative participation is different from NEPA participation on two levels. First, collaborative participation is a drawn out process, requiring a much greater commitment from the participant and more of their time and resources. In other words, the difference between the two forms of participation is the amount effort and time needed from the participant. In this sense, the two forms of participation are quantitatively different. If this difference is the central distinction between the two forms of participation, then we would expect the same relationships hypothesized for NEPA participation, but the strength of the relationships should be greater for collaborative participation.

Second, the other difference between the NEPA and collaborative participation is on a more qualitative level. Collaborative participation is simply a qualitatively different form of participation, one that requires two-interaction, consensus-building, power sharing, etc. If the qualitative differences are central, we would expect that different factors predict the two forms of participation. Unlike traditional resource management, a philosophy that underlies watershed management and watershed coalitions is the notion that humans are a part of nature. As such, we close this chapter with on one additional hypothesis.

> *Hypothesis 7*: Individuals who adhere to a more ecological worldview are much more likely to be interested in being involved in a watershed coalition.

CHAPTER FOUR

METHODOLOGY

I. Introduction

Chapter Four presents the methods and procedures used in this dissertation. There are three sections in this chapter. The first section describes the participant-observation methods used to examine the impact of the reorganization of TVA's nonpower program, interagency collaboration, and public participation in public lands and watershed management. The second section discusses the methods and procedures used in a telephone survey of residents living in the Norris Reservoir Watershed ("watershed residents") and of those who participated in TVA's Norris Public Lands Plan ("NEPA participants"). Finally, the third section briefly outlines the statistics used to address the objectives of this dissertation. By utilizing participant observation techniques and conducting two quantitative telephone surveys, this research attempts to lessen the impact of the limitations of each methodological strategy. Furthermore, using multiple methodologies also enables this research to address a wider range of pertinent research questions.

II. Participant-Observation

The central goal of the participant-observation stage of this research was to document the emergence, development and implementation of the watershed approach in the NRW, a process sponsored by TVA's Clinch-Powell Watershed Team (CPWT) and other government agencies. Within this process, a more particular goal was to evaluate the success of the CPWT at recruiting and creating a citizens-based watershed coalition for the NRW. Ideally, the interests and views of coalition members should be representative of those who are impacted (which includes residents and/or recreational users) by natural resource issues in the NRW. Thus, the creation of a representative citizens-based watershed coalition was a strategic requirement in the design of a successful watershed approach for natural resource management and planning for the NRW.

Participant-observation methods were used to help obtain information to fulfill the above goals. Participant-observation is a type of field research in which the researcher participates as a member of a group he or she is trying to study. Its main strength is the depth and richness of understanding it provides. It is also used as an effective strategy for understanding the contextually-based, subtle nuances of attitudes and behaviors that are difficult to capture by survey research and experimental design. Participant observation is especially suited for examining social processes that evolve over time.

I served as a participant and observer during the process in which the CPWT tried to implement its watershed approach for the NRW. My role was as a participant-as-observer; that is, I served as a full participant but also informed other participants that I was conducting research on this process. I attended a total of twenty meetings between January 1999 and July 2000. These meetings included CPWT meetings, interagency meetings, informal public meetings, formal public meetings, and casual meetings with the CPWT staff. Extensive and detailed notes were taken during each meeting, which were then rewritten and entered into the computer with field observations. In addition, the notes for each meeting were distributed to those who participated in the meeting for comments and to be checked for accuracy.

III. Telephone Surveys

The two telephone surveys are critical for this research due to three related reasons. First, the survey of watershed residents allowed for the collection of sociodemographic, attitudinal and behavioral data relevant to natural resource management issues in the NRW. Ultimately, all of these residents are impacted by watershed issues in the NRW. Aggregated sociodemographic and attitudinal data for watershed residents provides, in a sense, the social context of the NRW. This research assumes that social processes unfolding in the NRW will be impacted, at some level, by the social and biophysical context of the NRW. In other words, social context may serve as both bridges and barriers to implementing an ecosystem-based management approach. We also contend that analytically defining the social and biophysical context as isomorphic scales, demarcated by ecosystem boundaries, is more rigorous than omitting social context from the analysis or incongruously defining social context through existing political boundaries.

Second, the survey of watershed residents allows for a comparison of this population with the U.S. population on selected variables. Ecosystem-based approaches have been successfully implemented in other regions in the United States. If the watershed residents are significantly different from the U.S. population on key variables, this may impact and inform efforts to implement a watershed approach. For instance, given the historical and contemporary economic hardships faced by people who live in Appalachia and the adherence to individualism as a value, we would expect watershed residents to have lower socioeconomic status and be less trusting of government than the national population. If these assumptions are accurate, mobilizing watershed residents to participate may be more difficult in the NRW than in other regions of the U.S. Comparison variables were selected based on availability and hypothesized relationship to citizen participation.

Third, a comparison of the two surveys provides an empirical test of the claim that those who typically participate in traditional natural resource management possess higher levels of socioeconomic status than average citizens. Also, this comparison provides us with a rare opportunity to assess the degree to which NEPA participants represent the general public on resource issues facing the NRW. Fourth, the survey of NEPA participants provides information about a small pool of individuals – a group we call "potential coalition members" – from which the watershed coalition(s) will likely emerge. Fifth, after merging the data from the two surveys, we present the results from two estimated logistic regression equations, one for each of the two forms of citizen participation.

A. Watershed Residents Survey

The primary purpose of this telephone survey was to gain a basic understanding of the views watershed residents had about the public land management issues facing the NRW. The survey included sociodemographic variables and six sets of attitudinal questions, which included questions related to the recreational use of public lands and waters, environmental concern and attitudes, support for TVA's management of the public lands, political attitudes and values, political participation, and participation in natural resource management.

Telephone interviews were conducted with adult (18 years of age or older) residents living in the NRW. However, there were no readily available demographic data that could be used to directly identify the adult population living in NRW. This is because watersheds are defined by landscape features and not by census tracks or other politically-defined boundaries. We defined the targeted population ("watershed residents") by using Geographic Information Systems information to determine which census tract blocks were located in the biophysical boundaries of the NRW.

There were 75 census tract blocks selected to represent the NRW and they had a range of 61 to 100 percent of their total land area located within the watershed. Most (87%) of the census tract blocks, however, had more than 98 percent of its land located in the watershed, and overall, the average census tract block had 98 percent of its land in the NRW. Consequently, there was a very high probability that the households selected for the survey were actually located in the biophysical boundaries of the NRW. This sampling procedure also allowed a more rigorous assessment of the possible sociodemographic differences and similarities between the sample (households that completed interviews) and the targeted population (those who live in the 75 census tract blocks).

The census tract blocks selected to represent households in the NRW were identified by their census track and block group numbers. This information was the sent to Survey Sampling Inc. (SSI) of Fairfield, Connecticut who then generated a proportionate stratified random sample of listed telephone numbers for households living in the NRW. The number of households subsequently chosen in each census block was determined by the proportion of households in the particular census block divided by the total number of households across all of the census blocks in the NRW.

Households with listed telephone numbers were chosen to provide us with the names and addresses of potential respondents. This information was used to send each household a pre-survey letter that described the survey, its purpose, and its potential benefit to the participant. These letters were also sent out to increase participation rates. The sample of listed telephone numbers were distributed by county in East Tennessee in the following percentages: Campbell (52%), Claiborne (31.3%), Union (12.5%), Hawkins (1.9%), Anderson (0.9%), Grainger (0.9%) and Hancock (1.9%).

The targeted population of watershed residents thus included adults (18 years of age or older) living in households with a telephone number listed in a current (June 1999) telephone directory, and whose household had at least a 95 percent chance of being located within the NRW. A total of 2,000 listed telephone numbers were randomly selected and subsequently called.

Based on past survey research, we expected that the sample would include adults who were slightly more middle class, educated, and older than the population. This is due to the fact the sample only included households with listed telephone numbers which tend to over-represent less transient populations. Middle income households should also be slightly over-represented in the sample because they tend to have a lower proportion of unlisted telephone numbers than lower and higher income households. We also expected that women would be over-represented because they tend to answer the telephone at a significantly higher rate and thus, have higher participation rates in telephone surveys than men.

The data presented in Table 2 largely confirm our expectations. Older, more educated adults, females, and those from middle class households were over-represented in the sample. Compared to the population, the sample is over-represented by households that have no children. Our ability to generalize from the sample to the population hinges on the demographic differences between the sample and the population, and the impact that these differences may have on the substantive results of the survey. Based on existing research, we can only speculate what the impact may be. Although the purposes of the survey are many, the main substantive focus is address issues related to citizen participation. Since the less educated, younger, and less affluent members of the population are under-represented in the sample, we expect the population to be less efficacious and trusting of government than the sample. In turn, we expect the population to less likely to participate in environmental decision making than the sample.

Table 2: Selected Population and Sample Characteristics of Watershed Residents[a]

Response Categories	Population	Sample
Adult Age Groups		
18-34 years	28.3	14.9
35-64 years	53.3	62.1
65 years or more	18.4	23.0
Educational Attainment[b]		
Less than high school	39.2	20.6
High school diploma	33.6	41.5
Some college	17.7	24.8
College degree of more	9.5	13.1
County of Residence		
Campbell	52.0	50.2
Claiborne	31.3	31.9
Union	12.5	12.5
Hawkins	1.9	1.7
Anderson	.9	2.0
Household Income		
Less than $15,000	32.1	21.0
$15,000-$24,999	18.4	18.4
$25,000-$34,999	14.2	9.7
$35,000-$49,999	14.3	20.4
$50,000-$74,999	12.7	13.9
$75,000 or more	8.3	16.7
Gender		
Adult female	52.3	52.6
Adult male	47.7	47.4

Note: Main cell entries are percentages

a Population figures are based on 1999 estimates projected forward from the 1990 census which were provided by Survey Sampling Inc. of Fairfield, CT.

b Figures for educational attainment are based on adults who were 25 years of age or older.

Survey Instrument: Brent Marshall, Dr.Robert Jones, and James Talley began drafting a list of survey objectives in September of 1999. Some of these objectives were drawn from previous studies of three watersheds in Knox County (Jones et al. 2000; 1995). A preliminary list of survey objectives was revised and the final set of five objectives was used to design survey questions about natural resource management issues facing residents living in the NRW. Drafts of the initial pool of survey questions were written and revised from October 1 to November 10, 1999. The final set of questions was sent to the Office of Compliance and Contracts for a "human subject's" review. Upon review, the study and the questionnaire used in the telephone interviews were approved for implementation. The final survey instrument contained 90 questions. There were 18 sociodemographic questions, eight administrative questions, and 64 substantive questions about natural resource management issues facing the NRW.

Pre-Survey Letter: Most (n = 1,700 - 85%) of the potential respondents living in the NRW were sent a letter prior to conducting the interviews (Appendix B). Approximately 6 percent of these letters were undeliverable. Most of the returned letters were due to people moving or incomplete or incorrect mailing information. We were unable to meet mailing deadlines for the rest of the potential respondents (n = 300 - 15%). Subsequent analyses revealed that 68 percent of all of the actual survey respondents (n = 643) remembered receiving the pre-survey letter. The purpose of the letter was to inform them that an interviewer from the University of Tennessee would be calling their household, explain the reasons for the call, and request their assistance in completing the interview.

Data Collection: The interviews were conducted by the Social Science Research Institute at the University of Tennessee-Knoxville. The interviewers used a computer-assisted telephone interviewing (CATI) system to conduct the survey. The CATI system randomly selects telephone numbers to call from the pool of telephones numbers from the households located in NRW. The system displays questions on a computer monitor from which the interviewer can read to the respondent and then enter the response directly into a micro-computer for data storage. Supervisors randomly monitored interviews to ensure quality control.

A total of seven University of Tennessee students were provided three hours of training prior to the actual interviews. Training included how to use the CATI system and guidance on standard responses and probing techniques. Telephone interviews of "watershed residents" began November 20, 1999 and ended January 20, 2000. Interviews were conducted from Sunday to Thursday from 4 to 9 P.M.. The average interview lasted about 17 minutes. A total of 643 completed telephone interviews were conducted.

Interviews were conducted with individuals in the sampled households who were 18 years of age or older whose birth dates had occurred most recently. The "birthday method" of selecting adult members from each household was used to decrease over-representation of women that usually occurs with telephone surveys. This survey method asks the person who initially answers the telephone to let the interviewer talk to the member of the household who had the most recent birthday, and who is then asked to participate in the telephone interview.

Telephone Responses: Table 3 depicts the dispositional responses, cooperation and response rates, and the sampling error for the telephone survey of watershed residents.[8] The raw cooperation rate and the response rate for the survey are typical for telephone surveys conducted by the University of Tennessee of the general public. East Tennessee has a high rate of telemarketing, private use of answering machines, and other telephoning screening devices which depress these rates. The size of the sampling error for the NRW sample provides for an accuracy level of plus or minus 3.9 percent (i.e., the confidence interval). This means that 19 out of 20 times (or at the 95% confidence level) that a random sample of 643 is drawn, the sample estimate should be within plus or minus 3.9 percent from the population value. Consequently, the number of interviews conducted in this study should provide fairly accurate estimates of the general views and characteristics of the average resident living in the NRW.

B. NEPA Participants Survey

The primary purpose of this telephone survey was to gain a basic understanding of the views NEPA participants had about the public land management issues facing the NRW. The survey included the same administrative, sociodemographic, and substantive

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The cooperation rate is based on the ratio of the number of completed and partially completed interviews to the total number of completed, partially completed, and refusals. The response rate is based on the ratio of the number of completed and partially competed interviews to the total number of eligible respondents. Sampling error is the basis upon which tests of statistical significance are calculated. As the size of the sample increases, the sampling error goes down. The extent that a randomly selected sample represents the target population depends mostly upon the number of interviews completed.

Table 3: Breakdown of Telephone Responses: Norris Reservoir Watershed Residents

Responses Categories	N	Percent
Potential Respondents		
Interviews		
Complete interviews	643	32.2
Partial completes	116	5.8
Subtotal (a)	759	38.0
Others		
Immediate refusals (b)	430	21.5
Refusals by Targeted Respondents	160	8.0
(c)	255	12.8
No answer	57	2.8
Answering machines	35	1.7
Busy	12	0.6
Call backs (5 calls)	949	47.4
Subtotal (d)		
Total potential respondents (e)	1708	85.4
Ineligible or Excluded		
Non-working numbers	175	8.8
Fax/Bus/Gov/Other	87	4.4
Miscellaneous	30	0.02
Total Ineligible or Excluded	292	14.6
GRAND TOTAL	2000	100

Cooperation Rate: (a)/(a + b + c)	55.5%
Response Rate: (a)/(e)	44.4%
Sampling Error (n=643)	*+/- 3.9%*

questions as the watershed residents survey. As noted earlier, this particular group of citizens had been designated by the CPWT as participants in the Norris Public Lands Plan (NPLP), since they filled out the Norris Lake Watershed Survey. The NPLP is characteristic of the public participation strategy typically employed by TVA to manage public lands, as it meets the participatory requirements of the National Environmental Policy Act of 1969.

The names, addresses, and telephone numbers of the 341 individuals who completed TVA's Norris Lake Watershed Survey were obtained from TVA's Clinch-Powell Watershed Team (CPWT). These people had the opportunity to fill out TVA's survey by attending two public meetings, calling 1-800-TVA-LAND, or through a number of other outreach efforts by the CPWT. This group of individuals is referred to in this research as "NEPA participants." CPWT's Norris Lake Watershed Survey included two questions that asked respondents if they wanted to "be involved in a watershed coalition" and/or "help start a watershed coalition." Of the total of 341 survey respondents 53 wanted to be involved in a watershed coalition and 27 said that they would help start a coalition. We refer to these 80 individuals as "potential coalition members."

Survey Instrument: The procedures used to design this questionnaire will not be discussed because the final instrument was based on a slightly modified version of the NRW resident's survey.

Pre-Survey Letter: Most of the NEPA participants provided telephone and address information on TVA's Norris Lake Watershed Survey. Some of the missing information was recovered through telephone directory searches on the World Wide Web. Overall, we were able to obtain mailing and telephone information for 267 of the 341 (78%) participants. These people were then sent a letter prior to conducting the actual interviews. The purpose of this pre-survey letter was to inform the targeted individual that an interviewer from the University of Tennessee would be calling their household, explain the reasons for the call, and request their assistance in completing the interview. Only six (2.2%) of the letters were returned undeliverable and 98 percent of watershed residents remembered receiving the pre-survey letter when asked during the interview.

Data Collection: The interviews were conducted by the Human Dimensions Lab at the University of Tennessee-Knoxville. The interviewers used a computer-assisted telephone interviewing (CATI) system to conduct the survey. Five University of Tennessee students were provided three hours of training prior to the actual interviews. Training included how to use CATI system and guidance on standard responses and probing techniques. This group of interviewers also had prior experience conducting other surveys at Human Dimensions Lab. The telephone interviews began on June 2 and finished on June 13, 2000. There were 156 completed interviews and the average time to complete an interview was 17 minutes. Interviews were conducted with the person in each household who had participated in TVA's prior survey.

Telephone Responses: Table 4 depicts the dispositional responses, and the cooperation and response rates for the telephone survey of NEPA participants. The high raw cooperation rate and the response rate for the survey were better than expected for a telephone survey conducted by the University of Tennessee of pre-identified stakeholders. Since there were no known data on the social demographic characteristics of this population it was impossible for us to identify if any statistical differences existed between the survey sample and the population. There was no compelling reason, however, to assume that the survey results would not provide a fairly accurate picture of the general views and characteristics of the average person in this population since it contains a large percentage of the total number of members belonging to this targeted population.

IV. Statistical Analysis

Data from the telephone surveys were entered directly into SPSS (Statistical Program for the Social Sciences, Windows 95, Version 10.0) for statistical analysis. The sections below describe the univariate, bivariate, and multivariate statistical techniques that will be used to address the research questions and to test the hypotheses outlined in Chapter Three.

A. Univariate and Bivariate Analyses

Univariate statistics, drawn from the watershed residents survey, were used to describe the social context of the NRW. Univariate and bivariate statistics drawn from

Table 4: Breakdown of Telephone Responses: NEPA Participants

Response Category	N	Percent
Potential Respondents		
Interviews		
Complete interviews	156	58.4
Partial completes	7	2.6
Subtotal (a)	163	61.0
Others		
Immediate refusals (b)	7	2.6
Refusals by Targeted Respondents (c)	8	3.0
No answer	17	6.4
Answering machines	24	9.0
Busy	4	1.5
Call backs (5 calls)	26	9.8
Subtotal	86	32.3
Total potential respondents (d)	249	93.3
Ineligible or Excluded		
Non-working numbers	18	6.7
Total Ineligible or Excluded	18	6.7
GRAND TOTAL	267	100
Cooperation Rate: (a)/(a + b + c)	91.6%	
Response Rate: (a)/(d)	65.5%	

the NEPA participants survey will be used to describe the NEPA participants and the potential coalition members. The techniques described below are used to compare the sociodemographic and attitudinal characteristics of the watershed residents and NEPA participants, and the watershed residents and potential coalition members. Data from the watershed residents and NEPA participants survey will be merged into a single data set. A dichotomized ("dummy") variable will be created with a value of 'zero' assigned to the watershed residents and a 'one' assigned to the NEPA participants. A second dummy variable will be created by assigning a value of 'zero' to watershed residents and a 'one' to 'potential coalition' members, a subset of the NEPA participants. Each dummy variable will be used separately as a grouping variable, thus allowing the needed statistical comparisons. Cross tabulation procedures will be used to identify statistically significant ($p < .05$) group differences for nominal or ordinal variables. Asymptotic methods for calculating significant levels may produce biased results for sparse or unbalance tables. Given the small number of (n=51) "potential coalition members," the Exact and Monte Carlo methods of calculating significance levels will be used in the "watershed residents" and "potential coalition members" group comparisons. These conservative methods are reliable regardless of the size, distribution, or balance of the data. Independent-Samples T Test procedures will be used to identify statistically significant ($p < .05$, one-tailed probability test) group differences for interval level variables.

B. Factor Analysis

Confirmatory factor analyses were used to test the unidimensional structure of the following constructs: new ecological paradigm, political efficacy, and trust in government.[9] Questions for each scale were factor analyzed using a maximum likelihood solution with oblique rotation and list-wise deletion of missing values. Oblique rotation is an operation in which factors are rotated without the imposition of the orthogonality condition on the factors, thus allowing the terminal factors to be correlated with each other (Kim and Mueller 1978). Using oblique rotation allows a test of the assumption that the political efficacy and trust in government constructs are correlated. The criteria of including factors with minimum eigenvalues of one or greater will be used for specifying acceptable factor structure (Kim and Mueller 1978). Items with factor loadings of .4 or higher for each factor will be subpooled to construct simple additive scales which will then be used as independent variables in the estimated logistic regression equations. Subpooling saves cases when using listwise deletion of missing values. Simple additive scales are used due to their ease of substantive interpretation. Cronbach's alpha will be calculated to obtain an estimate of the scalability of items for each factor.

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Due to interviewer coder error, one of the four trust in government questions (Do you think that quite a few of the people running the government are crooked, not very many are, or do you think hardly any of them are crooked?) will not be used in the factor analysis. The response category "not very many are" was correctly read to the respondents as an option by some interviewers, while other interviewers misstated the category as "very many are."

C. Multivariate Analysis

Data from the watershed residents and NEPA participants surveys were merged into a single database. Dichotomous dependent variables measuring the two different forms of citizen participation – NEPA participation and interest in being in a watershed coalition – will be regressed on the same set of independent variables in separate estimated equations. See Table 5 for the descriptive statistics of the variables used in the logistic regression analyses.

Dependent variables: The first dependent variable will be a measure of NEPA-driven participation. The variable will be computed by assigning a value of "zero" to watershed residents and a value of "one" to the NEPA participants. NEPA participants are those individuals who filled out TVA's Norris Lake Watershed Survey, a brief survey used to inform the CPWT in the Norris Public Lands Plan (NPLP). The second dependent variable is a behavioral intent measure of interest in being involved in a watershed coalition. Specifically, the dependent variable is based on a single question asking respondents if they would be interested in being involved in a watershed coalition. The response categories include "not at all interested," "slightly interested," "moderately interested," and "very interested." A value of "one" is assigned to respondents who indicated they were "very interested" in being involved, while a value of "zero" is assigned to the other three categories. The second dependent variable will be referred to as "coalition participation."

Independent variables: In both regression models, the following independent variables will be used: education, income, age, gender, political efficacy, trust in

Table 5: Descriptive Statistics for Variables Used in the Logistic Regression Analyses

Variables	Range	Min.	Max.	Mean	Std. Err	N
Dependent Variables						
NEPA Participation	1	0	1	–	–	799
Coalition Participation	1	0	1	–	–	733
Independent Variables						
Education	3	1	4	2.5	0.036	792
Income	5	1	6	3.42	0.066	628
Age	68	19	87	52.29	0.53	789
Male	1	0	1	–	–	799
Trust in Government	15	4	19	7.1	0.136	661
Political Efficacy	12	3	15	6.65	0.115	789
Ecological Crisis	16	4	20	15.68	0.131	785
Anti- Anthropocentrism	16	4	20	13.31	0.142	777
Land/Water Use Freq.	5	0	5	2.2	0.067	795

government, ecological worldview, and the frequency in which people use the public lands and waters. Individuals are more likely to participate if they are educated, wealthy, older, males, politically efficacious, trusting in government, hold an ecological worldview, and frequently use the public lands and waters.

The education categories range from one equal to "less than high school" to four equal to "college degree or more." Household income categories range from a value of one assigned to "less than $15,000 per year" to a value of six assigned to "more than $75,000 per year." Respondents were asked what year they were born. We subtracted their response from 2000 to calculate their age. The age of the respondents ranged from 19 to 87 years old, with a mean age of 52. A value of zero was assigned to "females" and one assigned to "males." The frequency of visitation variable was created from two variables.

The first question asked respondents if they had visited public lands or waters in the NRW during the last year. Respondents who answered "no" to this question were assigned a value of zero. Respondents who answered "yes" to the first question were then asked how frequently they had visited public lands or waters in the last year. If they answered "less than five" times they were assigned a value of one, "6 to 12" times a value of two, "13 to 24" times a value of three, "25 to 53" times a value of four, and "more than 52" times a value of five. The trust in government index was created through a simple additive scale with values ranging from 4 (low trust) to 19 (high trust). Similarly, the political efficacy was created as a simple additive scale, with values for this index range from 3 (low efficacy) to 15 (high efficacy).

We also used questions that measure the New Ecological Paradigm. More specifically, Dunlap *et al.* (2000) expanded the earlier NEP scale to include fifteen questions measuring five beliefs: (1) reality of growth, (2) anti-anthropocentrism, (3) fragility of nature's balance, (4) rejection of exemptionalism, and (5) possibility for an ecological catastrophe. Our truncated version of this scale includes two questions measuring each of the above beliefs with the exception of 'fragility of nature's balance' belief.

Statistical techniques: The same statistical techniques were used for each separate logistic regression equation. Since the two dependent variables are dichotomous, we use binary logistic regression for the multivariate analysis of the data. The log odds of the two dependent variables (DVs) were regressed on the IVs. For each dependent variable, the results from two models were presented. In the sociodemographic model, we present the results of regressing the DVs on the four sociodemographic variables (education, income, age, and gender). In the full model, the DVs were regressed on the sociodemographic variables plus the other IVs – political efficacy, trust in government, ecological worldview, and frequency of land and water use.

In sequential logistic regression, the researcher typically enters the IVs into the model in an order determined by theoretical considerations (Tabachnick and Fidell 1996). Given Stern *et al.*'s (1995) model (presented in Chapter Three), one could certainly contend that variables measuring deeper level tiers should be entered into the regression model first since these variables structure the more concrete or peripheral tiers. The sociodemographic variables occupy the deepest tier, the position in the social structure, in Stern *et al.*'s (1995) model and thus should be entered first. We also contend that this sequential order of entry is useful for policy reasons.

Assuming that the four sociodemographic variables are good predictors of participation, resource managers could save financial resources by simply collecting the sociodemographic data from the U.S. Census, rather than conducting a survey. Managers could identify the census track blocks that best approximates the geographical boundaries of the watershed to be managed. If, however, the sociodemographic variables are not good predictors of participation, or if selected attitudes and behaviors are simply better, then it may be cost effective to conduct a telephone survey of watershed residents. The sequential logistic regression analysis will shed light on these two potentially different management strategies.

The results of several statistics are presented in Chapter Six. The chi-square statistic provides an indication of the overall fit of the data to the model. A significant chi-square indicates that the variables, as a set, contribute significantly to the dependent variable. In addition, we report the logistic coefficients and their standard errors (s.e.). The logistic coefficient (*B*) can be interpreted as the change in the log odds of the DV for one-unit change in the IV. The Wald chi-square also is reported. A variable with a significant Wald contributes significantly to the prediction of the dependent variable(s). We also report Exp(*b*), which is an odds ratio. Variables are regarded as significant at the $\alpha \leq .05$ level. The Nagelkerke R^2 is reported which is similar to the Adjusted R^2 in linear regression.

CHAPTER FIVE

CONTEXTUAL FACTORS: THE BIOPHYSICAL AND SOCIAL CHARACTERISTICS OF THE NORRIS RESERVOIR WATERSHED

I. Introduction

This chapter defines the biophysical and social context in which the CPWT will implement the watershed approach. The separation of the biophysical and social context is only analytically possible; empirically, the biophysical and social systems are interconnected and inseparable. These contextual factors may provide valuable insight regarding the bridges and barriers of implementing the watershed approach in the Norris Reservoir Watershed (NRW), and in Southern Appalachia more generally. The chapter is divided into four sections. The first section briefly outlines the biophysical characteristics of the NRW. The second section outlines the social context by utilizing a random sample, telephone survey of the citizens that live in the NRW. We refer to this population as the "watershed residents." Descriptive statistics will be presented outlining the sociodemographic and attitudinal characteristics of the watershed residents. The third section compares the sociodemographic and attitudinal characteristics of the watershed residents to the national population on selected variables. Comparison variables were selected based on availability and hypothesized relationship to citizen participation. The fourth section provides a brief conclusion.

II. Biophysical Context of Norris Reservoir Watershed

The watershed of the Clinch River and Powell River begins in southwestern Virginia and then cuts diagonally down and across into northeastern Tennessee. The Powell River was once a tributary of the Clinch River but now both rivers flow into Norris Reservoir. Consequently, the watershed of this river system is generally referred to as the Clinch-Powell Watershed. We have been referring to the portion of the Clinch-Powell Watershed located in Tennessee as the Norris Reservoir Watershed (NRW). Most of the biophysical data in this section is drawn from an informal, "working draft" document entitled "A Snapshot of Conditions in the Norris Reservoir Watershed" (TVA 1999). The NRW is located in a ridge and valley region of Southern Appalachia and it was the first reservoir developed by TVA. Permeable limestone underlies much of the topography of the Norris Reservoir, creating many caves and secluded shoreline alcoves.

The southwestern section of the NRW includes Norris Reservoir, which was created with the construction of Norris Dam in 1933. Norris Reservoir collects rainfall from a 2,912 square-mile watershed and the reservoir itself is contained in the Tennessee counties of Anderson, Campbell, Union, Claiborne, and Grainger. The NRW includes ten hydrologic units (as defined by the United States Geological Survey), a geographic area representing part or all of a surface drainage basin, a combination of basins, or a distinct hydrologic feature, within its boundaries. Approximately half of the watershed is under forest cover, which tends to protect streams from sedimentation and other nonpoint sources of pollution. About 35 percent of the watershed is used for agricultural, which usually increases sedimentation and nutrient input. Urban areas account for only 1 percent of the watershed. Overall, the condition of the riparian forests is fairly good, with five hydrologic units in the fair range (57% to 77% of the riparian zone under forest cover) and five in the good range (more than 77% under forest cover).

Norris Reservoir has 34,200 acres in surface area and there are two state wildlife management areas, three state parks, several country parks, and numerous boat ramps, marinas, campgrounds, and other public access areas along its 800 miles of shoreline. Water quality is generally fair, but bacteria contamination is a problem, especially from wastewater dumping by boats. Based mostly on biodiversity as an indicator, the ecological health of Norris Reservoir, the Clinch River, and the Powell river are fairly good. However, the ecological health of some of the streams and tributaries (e.g., Cove Creek, Big Creek, and Davis Creek) in the watershed is poor. Runoff from highway construction, mining, and agriculture is the main source causing erosion and siltation in some of the streams and tributaries. Incidently, these sources of water pollution are nonpoint sources and thus difficult to address.

Shoreline conditions are fairly good, but erosion and sedimentation are causing some loss of shoreline vegetation and have increased siltation in shallow areas. Eutrophication is a process triggered by an increase of nutrients, typically nitrogen and phosphorus, entering a lake. Of the four categories based on trophic status (oligotrophic, mesotrophic, eutrophic, and hypereutrophic), Norris Reservoir is placed in the healthiest, oligotrophic category (TDEC 1996). No fish consumption or water contact advisories exist on Norris Reservoir. Recreational users have the freedom to engage in water activities and consume the fish they catch without fear of contamination. Thus, no visually arresting advisory signs dot the shoreline.

Overall, present conditions are good. Given its relative pristine quality, Norris Reservoir is considered to be the "jewel" of the Tennessee Valley System and remains a popular destination for fishermen, boaters and other outdoor recreationists, as well for seniors and aging baby boomers who move there to retire. The beauty of Norris Reservoir and the surrounding area, unfortunately, is also the indirect cause of much consternation. In particular, two trends indicate the need for concern.

First, the population has steadily grown in the counties that surround Norris Reservoir and it appears that this trend will continue into the future. Population growth mostly impacts the watershed through residential development, which accelerates the impact of sedimentation. Norris Reservoir Watershed is contained within seven upper Eastern Tennessee counties – Campbell, Claiborne, Union, Hawkins, Anderson, Grainger, and Hancock. About 95% of the population in this section of the watershed, however, lives in three counties – Campbell (52%), Claiborne (31.3%), and Union (12.5%). Campbell County (the most populous of the three counties) grew in population by 9.7% between 1990 and 1999, from about 35,000 to more than 38,400. Claiborne County grew from some 26,000 to nearly 30,000 in the same period, an increase of 13.8%. Union County (the least populous of the three counties) experienced the greatest population growth (21.1%). It grew from about 13,700 in 1990 to some 16,600 people by 1999. These figures are generally in line with the change in statewide population growth

(12.4%) for the 1990 -1999 period, as well as the projected increase (12.3%) in the Southern Appalachia for the period 1990-2010.

Second, recreational activities in the watershed also are increasing at a fairly rapid pace. An increasing number of recreational users live outside the watershed and some do not live in Tennessee. The primary recreational activities include camping, swimming, boating, and fishing. The total number of hours of fishing on an annual basis had more than doubled from 267,371 in 1987 to 700,000 in 1996 (TVA 1999). An inventory of marinas on Norris Reservoir showed a total of 1,110 houseboats on the reservoir, with 333 of these being non-navigable. Almost half of the marina owners indicated that their harbors were full. Although time-series data for other recreational uses of the reservoir is limited, its safe to assume that these activities have also increased and will continue to do so. These two trends highlight the importance of proactively managing the public lands and waters in the NRW, maintaining existing levels of biodiversity and water quality, and restoring degraded areas.

III. Social Context of Norris Reservoir Watershed

The history of the Norris Reservoir Watershed in many ways is the opening chapter in the story of the Tennessee Valley Authority. The Tennessee Valley Authority was created during the depths of the Great Depression in 1933 and immediately began acquiring land in the rocky, sloping meadows of upper East Tennessee. Its purpose was to create a storage reservoir and hydroelectric facility at the junction of the Clinch and Powell Rivers, the northeastern tributaries of the Tennessee River. Work began on Norris

Dam only a few months after TVA was created. The construction project was first known as the Cove Creek Project, but was later renamed the Norris Project by the TVA Board of Directors in honor of Senator George W. Norris of Nebraska, who authored legislation creating the federal agency.

Norris was the first in a series of many TVA dams. Its construction began October 1, 1933 and ended when the reservoir began filling on March 4, 1936. During the peak construction period, about 2,750 workers were helping build the dam and clear the reservoir. The construction of the dam and the creation of the reservoir helped to define the social characteristics and boundaries of the Norris Reservoir Watershed (NRW). The town of Norris, built to house construction workers at the dam, was designed as a planned community with all-electric homes, tree-lined streets that followed the natural contours of the land and many public spaces. It was sold to private owners in 1948. The original layout of the town is still evident, and many of the early wood-shingled houses remain.

Recently, the gentle climate, scenic beauty, low taxes, and overall high quality of life in the area have attracted many new in-migrants. These domestic migrants are generally thought to be older, more affluent, and better educated, and seem to have a different set of values toward public land management than lifelong residents of East Tennessee (Jones, Fly, and Cordell 1999). Many of these in-migrants purchase homes in newly built gated communities, thus physically and symbolically separating themselves from the surrounding community.

A. Sociodemographic Characteristics of Watershed Residents:

The tables presented in this chapter can be found in Appendix A and the exact wording for each survey questions is in Appendix B. We did not obtain survey information on race because almost (97%) all of the residents living in the NRW are white. Due to this lack of racial variation in the population, we assumed that the typical survey respondent was white. The range of ages of the residents (adults 18 years of age or older), ran from 19 to 87 years of age. A small group (14.9%) of residents was composed of young adults (18-34 years of age), a larger group (23%) was composed of seniors (65-87 years of age), and the largest group (62.1%) was composed of middle age people (35-49 = 29.6%; 50-64 = 32.5%). The mean age is 52. (see Table A-1). There were slightly more women (52.6%) than men (47.4%) in the sample (see Table A-2).

Many (41.5%) of residents had a high school education, while a fifth (20.6%) had not completed high school. A quarter (24.8%) of them reported having some college, and a few (13.1%) had a college education or higher (see Table A-3). Many (41.1%) were employed full-time; three out of ten (27%) of them were retired. The rest were homemakers (14.8%), part-time workers (6.1%), unemployed (1.6%), students (1.6%), or in some other employment situation (7.8%) (see Table A-4) Only a small portion (18%) of them was employed in farming, ranching, or in the natural resource extractive industry (see Table A-5). Even fewer (5%) were employed in outdoor recreation, wildlife management, environmental protection, ecotourism, or any job that was based on natural amenities (see Table A-6).

Annual (1999) household income was evenly distributed across most income categories. About four-fifths (79.2%) of the respondent had an annual household income of less than $50,000. One-fifth (21%) of them had an income of less than $15,000, Similar figures were found for those that had between $15,000-25,000 (18.4%), $25,000-$35,000 (19.4%), and $35,000-$50,000 (20.4%). The remaining one-fifth (20.8%) of residents had household incomes that were more than $50,000 ($50,000-75,000 = 13.9%; more than $75,0000 = 6.9%) (see Table A-7). Nearly 60 percent (59.3%) of the residents owned rural land (see Table A-8). The number of acres owned by this group of residents (n = 381) ranged from one to 1,558 acres with the medium being eight acres and the mean being 35 acres (no table provided).

One-half (50.2%) of the people lived in Campbell County, and a one-third (31.9%) of them lived in Claiborne County. The rest (17.9%) of residents were the following counties: Union County (12.5%), Anderson (2%), Hawkins (1.7%), Grainger (1.1%) or Hancock (0.3%) (no table provided). One-half (49.4) of the residents lived on a farm, ranch or in open country. Three out of ten of them (30.8%) live in a small town or small city which had between 1,000 and 10,000 people. Less of them (19.8%) live in a city with more than 10,000 residents (see Table A-9). More than one-third (36.5%) of the residents had lived at their current residence for more than 20 years while the rest were divided between those that had lived there for less than five years (20.6%), five to 10 years (22.3%), and those that have lived there between 10 and 20 years (20.6%) (see Table A-10). Most (70.5%) of the residents had lived their entire life in Eastern Tennessee (see Table A-11).

B. Attitudinal Characteristics

1. Recreational Use of Public Lands and Waters: The first question asked residents if they had visited the public lands and waters in the NRW during the last 12 months. The results showed that most (70.3%) residents had visited these places in the last year (see Table A-12). This group of "recreationists" (n = 449) were then asked how many times they had visited these places during the last 12 months. Three out of ten (29.4%) of them had made fewer than five visits, a quarter (25.8%) of them made six to 12 visits, and another quarter (22.9%) made 52 or more visits during this time period. Fewer recreationists made 13 to 24 visits (10.3%) or 25 to 52 (11.7%) visits during this period (see Table A-13).

Finally, the recreationists were asked the type of activity that they had engaged in most during their visits in the last 12 months. The results of this open-ended question showed that they were active in fishing (35.1%), walking or jogging (15.5%), and motor boating (14.4%). Significantly less of the residents visited these places for swimming (7.6%), scenic driving (5.6%), picnicking (4.5%), and camping (3.8%). Very few recreationists made visits to public lands in the NRW for hunting (2%), hiking (1.3%), wildlife viewing (0.9%), canoeing or kayaking (0.7%), waterskiing (0.7%), jet skiing (.04%), or dirt biking (.02%) (see Table A-14).

2. Environmental Concern and Attitudes: The first question was more general then the other two and asked residents the degree to which they were concerned or unconcerned about environmental issues facing the nation. The results indicated that almost all (97.0%) of the residents were concerned about environmental issues. A majority (59.8%) were "very concerned" and one-third (39.2%) were moderately concerned. Very few (3.0%) of the residents were "unconcerned" about environmental issues facing the nation (see Table A-15).

We also found a high level of environmental concern about local issues facing the NRW. For example, almost all of the residents (97.8%) were concerned about the environmental quality of the public lands and waters in the NRW. Specifically, nearly two-thirds (66.9%) of the residents were "very concerned" and, of the remaining residents, most were (30.9%) "moderately concerned" about these issues. Again, the results showed that very few of the residents were unconcerned (3.2%) about this environmental issue (see Table A-17). Similar response patterns for another local environmental issue were found for question nine. It asked residents about the level of importance they placed on having clean water in the lakes, rivers, and creeks in the NRW. Almost all of them (95.9%) indicated that it was "very important." Most of the remaining residents (3.9%) thought that it was "somewhat important" to have clean water in the lakes, rivers, and creeks in the NRW (see Table A-16).

Two general questions asked residents about their general support for environmental protection and private development of the public lands in the NRW. The environmental protection question asked residents about their support for protecting public lands in the NRW in order to preserve environmental quality. The findings indicated that most of them (95.3%) supported this idea and did so very strongly (strongly agree = 83.9%; mildly agree = 11.4%). The few remaining residents (4.7%)

either opposed this proposal (strongly disagree = 1.4%; mildly disagree = 0.6%) or were unsure (2.7%) about it (see Table A-18).

The private development question asked residents about their support for opening-up public lands in the NRW to private development. The findings revealed that two-thirds (66.3%) of the residents opposed this idea. Specifically, nearly half (48.5%) "strongly" disagreed and one out of five (17.8%) "mildly disagreed" with having public lands in the NRW opened to private development. About one-fifth (19.4%) of the residents supported the idea of opening up these public lands to private development (strongly agreed = 5.8%; mildly agreed = 13.6%). The remaining residents (14.2%) were unsure about how they stood on this policy issue (see Table A-19).

Three questions measured whether or not support for private development varied if certain conditions were met. The first condition we examined addressed public concern for habitat protection. This proposal would "permit private development to occur on public lands in the NRW only if it did not threaten fish and wildlife habitats." The results revealed that about two out of three (65%) of residents would permit private development to occur if this condition was met (strongly agree = 44.2% vs. mildly support = 23.8%). One-fourth (27.8%) of the residents were either strongly (19.1%) or mildly (7.5%) against private development, even if the protection of fish and wildlife habitats were ensured (see Table A-20).

The second condition we examined addressed public concern for local economic growth. This proposal would permit private development to occur on public lands in the NRW, "only if it was necessary to sustain local economic growth." A slim majority

(50.7%) of the residents either strongly (16.6%) or mildly (34.1%) agreed with developing public lands, if it was necessary to sustain local economic growth. Nearly two out of five (37%) of the residents were opposed to private development, regardless of local economic issues (strongly disagree = 23%; mildly disagree 14.4%). The rest of the residents (11.9%) were unsure about their views on this proposal (see Table A-21).

The third condition we used measured public concern for the quality of community life. This proposal would permit private development to occur on public lands in the NRW, "only if it did not degrade the quality of life in the surrounding communities." We found that two-thirds (68%) of the residents either strongly (44.2%) or mildly (23.8%) agreed with the statement that public lands should be open to development, only if quality of life is not degraded. Moreover, many of these people strongly agreed with the statement (strongly agree = 44.2%; mildly agree = 23.8%). Still, one-fourth (26.6%) of the residents opposed the private development of public lands, regardless of the quality of life condition. Of those opposed, most were strongly anti-development (strongly disagree= 19.1%; mildly disagree = 7.5%). Few (5.5%) residents were unsure about their position on this specific proposal (see Table A-22).

3. Support for TVA's Management of Public Lands: Two questions were used to assess public support for TVA's management of public lands and waterways in the NRW. The first question asked residents to evaluate TVA's job performance at protecting and managing public lands and waterways in the NRW. The results revealed that nearly two-thirds (63.1%) of the residents were either very (16.7%) or somewhat (46.4%) satisfied with TVA's management of public lands in the NRW. A small, but significant minority of residents (25.7%) were dissatisfied (very dissatisfied = 7%; somewhat dissatisfied = 18.7%). Fewer residents (11.2%) were neither satisfied nor dissatisfied with the job TVA had done in this management area (see Table A-23).

The second question asked residents how frequently they trusted TVA to do what was right when it came to managing public lands and waterways in the NRW. We found that half (53.2%) of residents usually trusted TVA in these situations (just about always = 11.1%; most of the time = 42.2%). A large minority (37.9%) of the residents trusted TVA only "some of the time" and the remaining residents (8.9%) "almost never" trusted TVA in these situations. In summary, residents were generally satisfied with the job TVA had performed protecting and managing public lands and waterways in the NRW. Additionally, residents usually trusted TVA to do the right thing when it came to managing public lands and waterways in the NRW (see Table A-24).

4. Political Attitudes and Values: Over one-third (36.9%) of the people favoured Republican political views (conservative Republican = 19%; moderate Republican = 17.1%), while one-third (33.5%) favoured Democratic political views (liberal =8.2%; moderate = 25.3%). Three out of ten (29.6%) favoured Independent political views (see Table A-25).

Two sets of questions were used to measure "political efficacy" and "trust in government." The three questions measuring "political efficacy" used the 5-point Likert scale with response categories ranging from "strongly agree" to "strongly disagree," with a neutral or middle category of "not sure." The first question asked residents if they agree or disagree with the statement that "people like me don't have any say about what the government does." Nearly two-thirds (62.9%) of the residents exhibited low levels of efficacy by either "strongly" (38.5%) or "mildly" (24.4%) agreeing with this statement. Of the third with high efficacy (33.3%), nearly equal numbers strongly (16.9%) and mildly (17.3%) disagreed (see Table A-26).

The second question asked residents if they agree or disagree with the statement that "sometimes politics and government seem so complicated that a person like me can't really understand what's going on." Again, residents exhibited low levels of efficacy, with four out of five (81.2%) agreeing with this statement. Of those with low efficacy, one-half (55.5%) "strongly" agreed and one-quarter (25.7%) "mildly" agreed that politics were too complicated. Few residents (16.3%) had high levels of efficacy with roughly equal number "strongly" (7.7%) and "mildly" (8.6%) disagreeing with the statement (see Table A-27). The third question asked residents if they agree or disagree with the statement that "public officials don't care much what people like me think." Four out of five (79%) residents either "strongly" (52.0%) or "mildly" (27.0%) agreed that officials don't care. Few residents (16.8%) expressed high levels of efficacy by disagreeing with the statement (strongly disagreed=4.4%; mildly disagreed=12.4%) (see Table A-28).

Three questions measuring "trust in government" were used. The first question asked residents "how much of the time do you think you can trust the government in Washington to do what is right – just about always, most of the time or only some of the time?" Nearly three out ten (28.4%) residents responded that they could trust government in Washington "almost never," over one-half (55.7%) indicated "some of the time," and few (13.5%) answered "most of the time." Finally, only fifteen residents (2.4%) indicated that they could "just about always" trust government in Washington (see Table A-29). The second question asked residents if they would say that ". . . government is pretty much run by a few big interests looking out for themselves or that it is run for the benefit of all the people?" A strong majority (85.6%) of the residents indicated that government is "run by a few big interests," while few (14.4%) felt that government is "run for the benefit of all"(see Table A-30).

The third question asked residents "do you think that people in the government waste a lot of money we pay in taxes, waste some of it, or don't waste very much of it?" Most residents feel that government is very wasteful, with four of five (81.2%) answering that government wastes "a lot" of the money we pay in taxes. Most (18.0%) of the remaining residents indicated that government wastes "some" of the money, while only five residents (.8%) felt that government does not waste very much of tax money (see Table A-31).

5. Political Participation: Most (79.4%) residents reported that they usually voted in local elections (see Table A-32). Most of the residents (72.9%) had not attended public meetings or forums held by a government agency such as TVA (see Table A-33). Also, most (85.3%) residents did not have anyone in their household who was an active member in a club, group, or organization that tries to improve or protect the natural environment (see Table A-34).

6. Participation in Natural Resource Management: Three questions were used to address the issue of citizen participation. The first question asked residents about their interest in helping to improve recreational management on public lands in the NRW. We found that almost all of them (85.5%) were interested in participating in this activity and their interest was fairly high (very interested = 39%; moderately interested = 30.4%; slightly interested = 16%). Few residents (14.5%) were not interested in participating in this management activity (see Table A-35).

The second question asked residents about their level of interest in helping to improve fish and wildlife habitats on public lands in the NRW. We found about the same level of public interest for this activity. Four out five of the residents were interested (83.2%) in helping to improve fish and wildlife habitats and, again, they had a fairly high level of interest (very interested = 41.2%; moderately interested = 28.6%; slightly interested = 14.1%). Few residents (16.2%) were not interested in participating in this activity (see Table A-36).

The final question asked residents their level of interest in becoming involved in a watershed coalition. More specifically, They were told that this watershed coalition would address natural resource issues facing public lands in the NRW and that it would be a citizen-based group supported by government agencies. We found that watershed residents were not as interested in participating in the watershed coalition as they were for the other two management activities. Nevertheless, residents' interest (75.2%) in the watershed coalition was still moderately high (very interested = 29.4%; moderately 26.7%; slightly interested = 16%). One-fourth of the public (24.8%) were not interested in participating in a watershed coalition (see Table A-37).

IV. Comparison of the National Population and Watershed Residents

This section compares the watershed residents and the U.S. population on education, income, political efficacy, and trust in government. An important caveat should be noted. We are unable to determine whether or not the differences between the U.S. population and the watershed residents are statistically significant. Data for the national population was drawn from the 1998 National Election Studies (NES). Contextual factors at different scales may have an impact on management processes. The 1998 NES survey includes a region variable with four categories – Northeast, North Central, South, and West. The variation between the South region and non-South regions is not statistically significant for the "political efficacy" and "trust government" questions.

Significant differences do exist, however, for education and income; Southerners are slightly less educated and have lower incomes than residents in other regions. This moderate evidence suggests that the South as a context may be important for processes that are impacted by socioeconomic status. However, relying solely on contextual factors measured by existing units of analysis, such as geopolitical boundaries, may average out more important contextual variation at less aggregate levels of analysis. Thus, even though regional variation may be important, contextual variation may have greater explanatory power at smaller scales, such as the watershed level.

Income: Compared to the U.S. population, the watershed residents are slightly more likely to have a household income in the low-middle range ($25K-$35K) and less likely to have incomes in the highest range ($75K or greater). More specifically, nearly twice as many watershed residents (19.4%) have incomes in the "$25K-$35K" level than the national population (10.9%). Conversely, at the high end of the scale, few (6.9%) watershed residents made "$75K or greater" per year, whereas one out of six (16.7%) U.S. citizens made this amount or greater (see Table A-38).

Education: Major differences exist between the watershed residents and the national population. The watershed residents are much less educated than the U.S. population as a whole. For instance, three out of five (62.1%) watershed residents have either a "high school diploma" (41.5%) or "less than a high school diploma" (20.6%); whereas, two out of five (43.5%) U.S. citizens have either a high school diploma (30.2%) or less (13.2%). Perhaps more significant, 27.8 percent of the U.S. population has a college degree or higher, whereas this figure for watershed residents is only 13.1 percent (see Table A-39).

Political Efficacy: Three questions are used to measure the construct "political efficacy." All three questions use the 5-point Likert scale with response categories ranging from "strongly agree" to "strongly disagree." The first question asked residents if they agree or disagree with the statement that "people like me don't have any say about what the government does." Nearly two out of five (38.5%) watershed residents "strongly agreed" with the statement, compare to only 13.1 percent of the U.S. population. Almost half (47.6%) the U.S. population expressed high levels of efficacy by either "strongly" (12.3%) or "somewhat" (35.3%) disagreeing with the statement; whereas, one-third (33.3%) of the watershed residents disagreed – either "strongly" (16.0%) or "somewhat" (17.3%) (see Table A-40).

The second question asked residents if they agree or disagree with the statement that "sometimes politics and government seem so complicated that a person like me can't really understand what's going on." Although the data for this question suggests that most of the U.S. population (agreed = 71.0%) and watershed residents (agreed = 81.2%) have low efficacy, the percent with very low efficacy is much greater for watershed residents (strongly agreed = 55.5%) than for the U.S. population (strongly agreed = 25.2%) (see Table A-41).

The third question asked residents if they agree or disagree with the statement that "public officials don't care much what people like me think." The data indicates a pattern similar to the second question. Three out of five (60.0%) U.S. citizens and nearly four out of five (79.0%) residents agreed with this statement. Compared to the U.S. population (strongly agreed = 15.2%), more than three times as many (52.0%) watershed residents strongly agreed that public officials don't care. Overall, the data from these three questions consistently indicate that watershed residents have lower levels of political efficacy than U.S. citizens (see Table A-42).

Trust in Government: Three questions are used to measure the construct "trust in government." The first question asked residents "how much of the time do you think you can trust the government in Washington to do what is right – just about always, most of the time or only some of the time?" A majority of the U.S. population (58.6%) and watershed residents (55.7%) answered that they could trust government in Washington "some of the time." Yet, nearly three out ten (28.4%) residents responded that they "almost never" could trust government in Washington, whereas only 1.5 percent of the

U.S. population responded "almost never" (see Table A-43). The second question asked residents if they would say that "government is pretty much run by a few big interests looking out for themselves or that it is run for the benefit of all the people?" A strong majority (84.0%) of the watershed residents and two-third (66.7%) of the U.S. population indicated that government is "run by a few big interests" (see Table A-44).

Finally, the third question asked residents "do you think that people in the government waste a lot of money we pay in taxes, waste some of it, or don't waste very much of it?" Very few U.S. citizens (3.4%) or watershed residents (.8%) think that government "does not waste much" of our taxes. In fact, more than three out of five (61.8%) U.S. citizens and four of five (79.7%) watershed residents think that government "wastes a lot" of the money we pay in taxes. In summary, the evidence suggests that the U.S. population and watershed residents do not trust government in Washington; watershed residents, however, are considerably less trusting than U.S. citizens (see Table A-45).

CHAPTER SIX

FINDINGS

I. Introduction

This chapter is divided into four sections. The first section draws on participant-observation data to assess the impact that reorganization of TVA's nonpower programs has on the ability of the newly created CPWT to implement the watershed approach. Section two utilizes participant-observation data to assess the degree to which the CPWT was successful in promoting interagency collaboration and cooperation. The third section draws on participant-observation and two telephone surveys to provide an assessment of interagency efforts to mobilize citizen participation in the watershed coalition. After many unsuccessful attempts to recruit coalition participants from the general population of residents living in the NRW, it became clear that the citizen-based watershed coalition would not emerge in time to be included in the dissertation. The CPWT changed their strategy by recruiting individuals who had participated in the NEPA-driven, Norris Public Lands Plan (NPLP). Thus, the pool of potential watershed coalition participants includes those who indicated they wanted to "be involved in a watershed coalition" on the Norris Lake Watershed Survey (NLWS). We conducted a second telephone survey of those individuals who filled out the NLWS, a group we refer to as "NEPA participants."

The fourth section uses the survey of watershed residents and the second telephone survey of NEPA participants to address three important research questions.

First, a common critique of NEPA-driven participation is the claim that those who participate have higher socioeconomic status than average citizens. By comparing the sociodemographic characteristics of watershed residents and NEPA participants, we provide an empirical test of this claim. Additionally, we examine whether or not significant differences exist between the two groups on attitudinal variables hypothesized to be related to citizen participation. Second, the survey of NEPA participants provides information about a small pool of individuals – a group we call "potential coalition participants" – from which the watershed coalition(s) will likely emerge. Ideally, participants in the watershed coalition should be representative of those who live in the watershed. We determine the likelihood that the representativeness criteria will be met by comparing the "watershed residents" to the "potential coalition participants." Third, after merging the two data sets, we present the results from two estimated logistic regression equations. It should be noted that the watershed management approach is a long, complex, evolving process that has many different stages. Our data only captures the first 19 months of this process. As such, the assessment provided below is preliminary, based only on the early stages of this developmental process.

II. Reorganization of TVA's Nonpower Programs

Before 1995, TVA's nonpower programs were structured around four main offices, one in the Tennessee cities of Norris, Morristown, Chattanooga, and in the city of Muscle Shoals, Alabama. This division reflected historical, political, and regional aspects of natural resource management. In 1995, TVA reorganized its nonpower programs into eleven land management teams and a number of River Action teams. This reorganization aligned land management responsibilities with ecosystem boundaries, as defined by watersheds. In 1999, eleven multidisciplinary 'Watershed Teams' were created by combining the functions of former land management teams and the River Action teams. Merging the tasks of land management and water assessment represents organizational recognition that aquatic health and water quality issues are integrally linked to land use patterns. In January 1999, the Clinch-Powell Watershed Team (CPWT) became the first of TVA's watershed teams to begin the process of implementing a comprehensive watershed management approach. Thus, the early successes and setbacks of this process will inform efforts by the other watershed teams.

It is too early to evaluate the overall impact of reorganization on the agencies involved or on people who use and/or live in the watershed. Yet, participant-observation data indicate that the initial results have been positive for four reasons. First, interdisciplinary and in-depth discussions about watershed issues seemed to occur on a daily basis among the CPWT. Second, the decentralized structure of the nonpower programs has enabled the CPWT to be accessible to recreational users, the general public and to people who live in the NRW. Third, the CPWT seems to possess a considerable degree of flexibility in responding to issues that arise in the watershed.

Fourth, reorganization has allowed TVA to manage watersheds at multiple, hierarchically nested scales – one of the central tenets of the watershed approach. For instance, TVA completed the Shoreline Management Initiative in 1996 which established a policy, with citizen involvement, to protect the shoreline and aquatic resources of the

Tennessee River and all of the TVA-constructed or -owned reservoirs in the Tennessee Valley. This initiative represents management at the river basin or region scale. Watershed plans by the eleven watershed teams represent management at smaller scales, which are located within the Tennessee Valley. Further observation is necessary.

III. Promoting Interagency Collaboration

The CPWT organized two interagency meetings in the Fall of 1999. From the beginning, the Team attempted to mitigate the likely impression that this would be a TVA-dominated process. To this end, TVA facilities were not used for the two meetings and a professor from the University of Tennessee was hired to facilitate the first meeting. These two meetings were loosely structured and it was hoped that an interagency team would emerge, lending technical support to the (not yet formed) watershed coalition.

Twenty-five participants attended the first meeting with representatives from the following agencies: U.S. Fish and Wildlife Service, Tennessee Wildlife Resources Agency (Chuck Swan & Royal Blue/Cove Creek), Tennessee Department of Environment and Conservation, National Park Service, Tennessee Department of Forestry, Norris Dam State Park, Tennessee Parks (Big Ridge State Park and Cove Lake State Park), Grainger Soil Conservation District, U.S. Army Corps of Engineers, Natural Resource Conservation Service, Southern Appalachian Man and the Biosphere, and District Conservationist. Everyone at the first meeting was invited to attend the second meeting.

Only seven non-CPWT agency participants attended the second meeting with representatives from Tennessee Wildlife Resources Agency, Tennessee Department of Environment and Conservation, Tennessee Department of Forestry, Southern Appalachian Man and the Biosphere, and District Conservationist. The CPWT was disappointed by the low attendance, but nonparticipants indicated via telephone and email that they were still committed to the project.

The participant observation data regarding these meetings can be summarized into four sets of findings. First, each agency agreed to share data to improve on TVA's working draft document entitled "A Snapshot of Conditions in the Norris Reservoir Watershed" (TVA 1999). Reflecting an adaptive management approach, one agency participant reiterated that "we need to always treat the 'conditions report' as an evolving, working draft." Effective watershed management requires the best data and monitoring possible. Agency participants also discussed that possibility of creating a website which would allow citizens to obtain information about the role of each agency in the NRW and access data regarding the environmental conditions of the NRW.

Second, although each agency has different goals and mandates, most agency representatives felt that the collaborative and team-building efforts by the CPWT were necessary. Most of the agency representatives also spoke the same language of "ecosystem-based management" which reflects a much more flexible institutional and adaptive resource management approach. Evidence of an early consensus existed, as nearly everyone agreed that residential developed was a threat to water quality and watershed health. Additionally, over one-half (14 out of 25) of the agency participants indicated that residential development posed the most serious threat to biodiversity and the aquatic health of the NRW.

Third, it became obvious to all of the agency representatives that TVA's Norris Public Lands Plan and Tennessee Department of Environment and Conservation's (TDEC) Norris Watershed Plan overlapped geographically and was occurring at the same time. As a result, it was decided that it would be less confusing for the public and more cost-effective for the agencies to hold joint public meetings. TVA/TDEC cooperation provides not only an example of interagency collaboration, but also federal-state collaboration – a friendly exchange that rarely happened during an earlier era. Fourth, interagency team goals were clarified. The participants agreed that the most important goal was to generate widespread public involvement in the TVA's Norris Public Lands Plan, TDEC's Watershed Plan, and ultimately the citizen-based watershed coalition. In other words, the interagency team set forth a process with the goal of generating two largely distinct forms of public participation – NEPA-driven and collaborative participation.

The interagency meetings also indirectly encouraged two examples of interagency cooperation. First, TVA and TWRA collaborated on a project. The TVA sold public land that included a quarry and a human-made wetlands to private interests. In lieu of the requirements of the Wetlands Mitigation Act, TVA and TWRA created a wetland on TWRA land and to be managed by TRWA. Second, there has been discussion about creating an office building and research facility in the NRW that would house all relevant interagency staff whose jurisdiction lies in the watershed. If this comes to fruition, it would be a momentous step toward achieving ecosystem management in the NRW – as it would encourage interagency collaboration, reduce interagency overlap, and promote interdisciplinary analyses.

IV. Interagency Efforts to Mobilize Citizen Participation

It should be remembered that getting more citizens to participate is only part of the participatory goal of ecosystem-based approaches. Citizens who participate should represent, as much as possible, the range of citizen interests in the watershed and their participation should have an impact on all stages of the decision-making process. In general, the CPWT efforts to generate citizen interest in the Norris Watershed Coalition were not as successful as they had hoped.

Two separate informal meetings were held (25 citizens attended each meeting) to generate interest in the Norris Watershed Coalition. Since the citizens who participated were identified by the interagency team, many of the participants represented organized groups which run counters to the participatory goals of ecosystem management. A strange dynamic emerged during these meetings which may explain why a watershed coalition did not emerge from this stage of the process. The CPWT, taking the role of facilitator, was trying to get the citizens to identify critical problems in the watershed and to offer solutions. The citizens agreed this type of work needed to be done, but were looking to TVA for expertise and guidance. It seems that collaborative decision-making requires agency representatives and citizen participants to assume unfamiliar roles. Many citizens indicated interest in the watershed coalition, but simply did not have the time to participate because of their ongoing involvement in other social organizations and groups. CPWT had hoped that the watershed coalition would form shortly after the two informal meetings but since no one volunteered to take the lead, no watershed coalition formed. Instead, these citizens were encouraged by CPWT to participate in the upcoming public meetings in the NRW that were being co-sponsored by TVA and TDEC.

Paid advertisements in local newspapers were used to notify citizens that they could participate in TVA's Norris Public Lands Plan and TDEC's Watershed Plan by attending either of the two joint public meetings. Additionally, citizens could participate in TVA's Norris Public Lands Plan by completing the Norris Lake Watershed Survey at the joint public meetings, by calling 1-800-TVA-LAND or through a number of other outreach efforts sponsored by the CPWT. The primary purpose of the TVA/TDEC public meetings was to generate citizen involvement in public lands management, a process typically utilized to meet the participatory requirements of the National Environmental Policy Act of 1969. Additionally, TVA and TDEC wanted to reduce the anticipated confusion by explaining to the public the role and objectives of each agency regarding the NRW.

These meetings were supposed to focus only on nonpower management issues facing public lands and waters in the NRW. However, some participants expressed their dissatisfaction with inconsistent reservoir water levels set by TVA to meet its power generation needs. Some members of the CPWT indicated that the contentious issue of reservoir water levels has interfered with the progress of past meetings. Nevertheless, many in attendance provided important input during the breakout sessions. Citizens were clearly concerned about environmental degradation in the NRA and, in particular, the negative impact that such degradation would have on quality of life, property values, outdoor recreation, and tourism.

Although the primary use of the Norris Lake Watershed Survey was to inform the Norris Public Lands Plan, two questions were included that asked respondents to if they wanted to "be involved in a watershed coalition" and/or "help start a watershed coalition." Of the total of 341 survey respondents 53 wanted to be involved in a watershed coalition and 27 said that they would help start a coalition. We refer to these 80 individuals as "potential coalition members." The CPWT then subcontracted with a nonprofit group to call each of the 80 interested individuals to set up four separate watershed coalition meetings held in geographically dispersed locations in the NRW.

The hiring of the nonprofit group further supported earlier efforts by the CPWT to take a less visible role in the process of creating a citizen-led watershed coalition. Citizens need to be assured that once formed the watershed coalition would have some autonomy and power to make land management decisions in the NRW. Some evidence also suggests that rigid bureaucracies, such as TVA, can increase their institutional flexibility – a fundamental requirement of any ecosystem-based management approach – by subcontracting out work to nonprofit groups. By the end of July 2000, two watershed coalitions were in the process of being formed. The overall success of CPWT's efforts to increase citizen participation through watershed coalitions has yet to be determined.

V. Representativeness of Citizen Participation

The analysis in this section uses survey data from both the watershed residents and NEPA participants. First, we provide an empirical test of the often-stated critique that those who participate in NEPA-driven participation are not representative of the general public. Second, we assess the likelihood that the watershed coalition will be representative of the watershed residents. This assessment is based on the comparison between the watershed residents and the "potential coalition members." Note that the tables listed in this chapter are in Appendix A and the exact question wording for each variable is listed in Appendix B.

A. Comparison of Watershed Residents and NEPA participants.

1. Sociodemographic Characteristics: This section reports statistically significant ($p < .05$) sociodemographic group differences for the watershed residents and the NEPA participants. See Table 6 for a summary of the sociodemographic differences and similarities between watershed residents and NEPA participants. Significant differences were found for age. NEPA participants were slightly older (mean age = 55 years) than watershed residents (mean age = 52 years) (see Table A-1). The gender difference between the two groups is significant and quite large. There were 30 percent more males (77.6%) in the group of NEPA participants than there were among watershed residents (47%) of the NRW (see Table A-2). Significant group differences were found for education, with NEPA participants much more educated than the watershed residents. Over one-fifth (20.6%) of the watershed residents had less than a high school degree,

Table 6: Sociodemographic Characteristics: A Comparison of Watershed Residents and NEPA Participants

Characteristic	Watershed Residents	NEPA Participants
1. Age	Slightly younger	Slightly older
2. Gender	Roughly equal	More males
3. Education	Less educated	More educated
4. Employment	Less full-time workers More homemakers Fewer retirees	More full-time workers Fewer homemakers More retirees
5. Job in Natural Amenities	Few employed	More employed
6. Job in Resource Extraction	Few employed	Few employed
7. Household income	Lower incomes	Higher incomes
8. Own rural land	Majority owned land	Majority owned land
9. Number of Acres owned	Medium = 8 acres	Medium = 6.5 acres
10. Place of Residence	Less populated areas	More populated areas
11. Residency in East TN	More lifetime residents	Fewer lifetime residents

whereas less than 1 percent of the NEPA participants had less than a high school degree. At the other extreme, few (13.1%) watershed residents had a college degree or higher, while over one-half (51.3%) of the NEPA participants had a college degree or higher (see Table A-3).

There were significant group differences found for general categories of employment. Compared to the watershed residents, more NEPA participants were working full time (53.8% vs 40.9%), more were retired (39.1% vs 26.9%), and less were homemakers (1.9% vs 14.8%) (see Table A-4). Significant group differences were also found for employment in natural amenities. More of the NEPA participants (13.5%) had jobs in outdoor recreation, wildlife management, environmental protection, and ecotourism than did the watershed residents (5%) (see Table A-6). No significant group differences were found for employment in natural resource extractive industries such as farming, timber, or mining (TVA = 16%: NRW = 18%) (see Table A-5).

Significant group differences were found for income. NEPA participants were considerably more affluent, as measured by their 1999 annual household income, than the watershed residents. For instance, nearly two-thirds (62.4%) of NEPA participants made more than $50,000, while only one-fifth (20.8%) of the watershed residents made the same amount. At the other end of the scale, 21 percent of the watershed population earned less than $15,000 annually, while only 3.8 percent of the NEPA participants earned less than $15,000 (see Table A-7). No significant group differences were found regarding ownership of rural land (see Table A-8) and the number of acres of rural land owned (no table provided).

There were significant group differences found for place of residence. More of the watershed residents (49.4%) than NEPA participants (36.3%) lived on a farm while more of the NEPA participants (15.8%) than watershed residents (less than 1%) lived in a city with a population of more than 100,000 people (see Table A-9). There were no significant group differences in the length of current residence (see Table A-10). There were also significant group differences in lifetime residency in East Tennessee. More watershed residents (70.5%) than NEPA participants (54.5%) were lifetime residents of East Tennessee (see Table A-11). Notably, nearly one-third of the NEPA participants live outside the watershed; whereas, none of the watershed residents – due to sample selection – live outside of the watershed (no table provided). In sum, NEPA participants were significantly different ($p < .05$) than the watershed residents for eight of the eleven sociodemographic variables we examined.

2. Recreational Use of Public Lands and Waters: Table 7 summarizes the overall attitudinal similarities and differences between watershed residents and NEPA participants. There were significant differences regarding whether or not and often respondents visited public and lands and waters in the NRW. More NEPA participants (96.8%) than watershed residents (69.8%) visited public lands and waters in the NRW in the last year (see Table A-12). There were also significant group differences in the number of visits with NEPA participants visiting them more frequently. For example, over one-half (57.7%) of the NEPA participants who had made visits to these areas, had visited them more than 25 times in the last year compared to just over one-third (34.6%) of the watershed residents (see Table A-13).

Table 7: Attitudinal and Behavioral Characteristics: A Comparison of Watershed Residents and NEPA Participants

Attitudes or Behaviors	Watershed Residents	NEPA Participants
Recreational Use of Public Lands and Waters in the NRW		
Visited (yes/no)	Most	Almost All
# of Visits	Less	More
Type of Recreational Activity	More fishing	Less fishing
	Less motor boating	More motor boating
	More jogging/walking	Less jogging/walking
Environmental Concern		
Environmental Quality in Nation	Moderately high	Moderately high
Environmental Quality in NRW	Moderately high	Moderately high
Importance of Clean Water	Very high	Very high
Protect Public Lands in NRW	Strong support	Strong support
Develop Public Lands in NRW	Less opposition	More opposition
. . . to Maintain Quality of Life	Less opposition	More opposition
. . . if No Threat to Habitats	Less opposition	More opposition
. . . to Sustain Local Econ.	Less opposition	More opposition
TVA's Management of Public Lands		
Satisfied with TVA's efforts	Somewhat satisfied	Somewhat satisfied
Trust TVA to Do What is Right	Most of the time	Most of the time
Political Attitudes and Values		
Political View	Mod. partisan/Indep.	Mod. partisan/Indep.
Political Efficacy	Lower efficacy	Higher efficacy
Trust in Government	Slightly less trusting	Slightly more trusting
Local Political Participation		
Vote in Local Election	Fewer voters	More voters
Attended Public Meeting	Fewer attendees	More attendees
Active in Environmental Group	Less active	More active
Interest in Participating in Resource Management in the NRW		
Recreational Management	Very or moderately	Very or moderately
Improving Habitats	Less very or moderately	More very or moderately
Joining Watershed Coalition	Less very	More very

The two groups also significantly differed in how they used the public lands and waters in the NRW. On one hand, motor boating was much more popular among NEPA participants (40.5%) than for watershed residents (14.4%). On the other hand, fishing was more popular among watershed residents (35.1%) than for NEPA participants (23.6%). There were also more joggers/walkers among watershed residents (15.5%) than for NEPA participants (1.4%). Finally, scenic driving was also more popular among watershed residents (5.6%) than it was for NEPA participants (<1%) and similar patterns were also found for picnicking (see Table A-14).

3. Environmental Concern and Attitudes: There were no significant differences found regarding concern for the national environment (see Table A-15), concern for public lands and waters in the NRW (see Table A-17), and the importance place on clean water in the NRW (see Table A-16). Based on these three indicators, watershed residents and NEPA participants exhibited high levels of concern for the environment locally and nationally.

Two questions were used to assess general attitudes regarding how public lands should be used in the NRW. There were no significant differences when respondents were asked whether they agreed or disagreed with protecting public lands in the NRW for environmental reasons (see Table A-18). Another question asked respondents about their support for opening-up public lands in the NRW to private development. There were significant differences on this item. For example, four out of five (81.9%) of the NEPA participants disagreed (strongly = 67.7%, mildly = 14.2) with the idea of allowing public lands in the NRW being opened to private development, while significantly fewer

(66.3%) of the watershed residents felt this way (strongly = 48.5%, mildly = 17.8%) (see Table A-19).

Three questions examined to what degree the lack of public support for private development was conditional. This proposal would permit private development to occur on public lands in the NRW *only if it did not degrade the quality of life in the surrounding communities.* There were significant differences on this item. For example, twice as many NEPA participants strongly disagreed (39% vs 19.1%) with this condition for private development. Moreover, significantly fewer of the NEPA participants agreed (strongly = 26.6%, mildly = 24%) with this proposal than did the watershed residents (strongly = 44.2%, mildly = 23.8%) (see Table A-22). Compared to the other conditions, the findings also indicated that there would be less opposition to private development from both groups if the "quality of life" condition was guaranteed.

A second condition we examined asked respondents about public concern for habitat protection. This proposal would *permit private development to occur on public lands in the NRW only if it did not threaten fish and wildlife habitats.* There were significant differences found on this item. Again, almost twice as many NEPA participants than watershed residents strongly disagreed (37% vs 19.5%) with allowing private development to occur, even if habitats were to be protected. Significantly fewer of the NEPA participants agreed with the statement (strongly = 23.4%, mildly = 25.3%) than watershed residents (strongly = 36.6%, mildly 28.8%) (see Table A-20).

A third condition we examined addressed public concern for local economic growth. This proposal would permit private development to occur on public lands in the

NRW, "*only if it was necessary to sustain local economic growth.*" There were significant group differences found on this item. Again, twice as many NEPA participants (47.7% vs 23%) strongly disagreed with this proposal. Significantly fewer NEPA participants agreed (strongly = 5.9%, mildly = 29.4%) with the proposal than did watershed residents (strongly = 16.6%, mildly = 34.1%) (see Table A-21). Relatively speaking, this proposal faced the most opposition among both groups. In other words, local economic growth was not as important as protecting habitats and maintaining the quality of life.

4. Support for TVA's Management of Public Lands: Two questions were used to assess support for TVA's management of public lands and waters in the NRW. The first question asked respondents whether or not they were satisfied with TVA's management and protection of public lands and waters in the NRW. There were no significant group differences found on this TVA job satisfaction item (see Table A-23). The second question asked respondents if they thought TVA would do what was right when it came to managing public lands and waters in the NRW. Again, no significant group differences were found for the trust in TVA questions (see Table A-24).

5. Political Attitudes and Values: Analyses revealed that there were no significant group differences in political views. About seven out of 10 members from each group identified themselves as either a moderate Republican, an Independent, or a moderate Democrat (see Table A-25). Significant differences do exist for all three political efficacy questions. The first question asked respondents if they agree or disagree with the statement that "people like me don't have any say about what the government does." Nearly two-thirds (62.9%) of the watershed residents exhibited low levels of efficacy by either "strongly" (38.5%) or "mildly" (24.4%) agreeing with this statement. The figures for NEPA participants are considerably lower, with just over half (52.2%) agreeing with the statement (strongly agree= 21.9%; mildly agree=30.3%). Perhaps more telling, 38.5 percent of the watershed residents picked the lowest efficacy category (strongly agree); whereas, only 21.9 percent of the NEPA participants chose this category (see Table A-26).

The second question asked respondents if they agree or disagree with the statement that "sometimes politics and government seem so complicated that a person like me can't really understand what's going on." Watershed residents exhibited very low levels of efficacy, with over half (55.5%) choosing strongly agree; only 25.2 percent of the TVA participants chose this category. Conversely, 16.3 percent of the watershed residents exhibited high levels of efficacy (mildly or strongly disagree), while nearly half (45.2%) of the NEPA participants had high efficacy (see Table A-27). The third question asked respondents if they agree or disagree with the statement that "public officials don't care much what people like me think." Four out of five (79%) watershed residents either "strongly" (52.0%) or "mildly" (27.0%) agreed that officials don't care. More than three out of five (63.2%) NEPA participants either "strongly" (30.3%) or "mildly"(32.9%) agreed with the statement (see Table A-28).

Three questions measuring "trust in government" were used. The first question asked respondents "how much of the time do you think you can trust the government in Washington to do what is right – just about always, most of the time or only some of the time?" Differences between the two groups were not significant. Notably, however, nearly three out ten (28.4%) watershed residents responded that they could "almost never" trust government in Washington to do what is right; whereas, one-fifth (20%) answered "almost never" (see Table A-29). The second question asked respondents if they would you say that ". . . government is pretty much run by a few big interests looking out for themselves or that it is run for the benefit of all the people?" Group differences for this question are significant. A strong majority of 85.6 percent of the watershed residents indicated that government is "run by a few big interests," while 77.1 percent of the NEPA participants chose the "run for the benefit of all" response (see Table A-30). The third question asked respondents "do you think that people in the government waste a lot of money we pay in taxes, waste some of it, or don't waste very much of it?" Group differences were not significant for this question (see Table A-31).

6. Political Participation: Significant group differences were found for voting behavior. A higher proportion of the NEPA participants (88.5%) voted in local elections than did watershed residents (79.4%) (see Table A-32). There were significant group differences regarding attendance at public meetings. Significantly more of NEPA participants (71.8%) than the watershed residents (26.9%) had attended a public meeting or a forum held by a government agency such as TVA (see Table A-33). Significant group differences were also found on environmental group membership. NEPA participants (45.5%) were considerably more likely than watershed residents (14.7%) to be active members of a club, group or organization that tries to improve or protect the natural environment (see Table A-34).

7. Participation in Resource Management: Three questions were asked to assess whether or not respondents were interested in participating in resource management. Each question asked the respondents if they would be "very interested," "moderately interested," "slightly interested," or "not at all interested" in improving "fish and wildlife habitats," "improving recreational management,"and "being involved in a watershed coalition." Interest in improving recreational management was not significantly different between the two populations (see Table A-35). There were significant differences, however, regarding interest in improving habitats and being involved in a watershed coalition. For instance, more NEPA participants (81.8%) were very (46.8%) or moderately interested (35%) in improving habitats than residents (69.8%) of the NRW (41.2% and 28.6%, respectively) (see Table A-36). Similarly, the data revealed that more of the NEPA participants (73%) were interested (very = 44.1%, moderately = 28.9%) in getting involved in a watershed coalition than watershed residents (56.1%) living in the NRW (very = 29.4%, moderately = 56.4%) (see Table A-37).

B. Comparison of Watershed Residents and Potential Coalition Members

Given that the "potential coalition members" (n=51) are a subset of the "NEPA participants" (n=156), it is not surprising that the differences between "potential coalition members" and "watershed residents" parallel the differences between "NEPA participants" and the "watershed residents." In fact, the group differences between potential coalition members and watershed residents are virtually the same or slightly greater than the group differences between watershed residents and NEPA participants for most sociodemographic and attitudinal variables.

However, exceptions do exist. For each conditional question regarding the development of public lands, more of the NEPA participants "strongly disagreed," despite the claim that certain conditions would be met, with opening up public lands for development than the watershed residents or the potential coalition members. In other words, NEPA participants are more "strongly" against the development of public lands than the other two groups, and their anti-development position is less conditional. The differences between NEPA participants and potential coalition members on the three conditional questions are statistically significant (no table provided).

Compared to the NEPA participants, there were five variables in which potential coalition members were significantly less representative of the watershed residents. In other words, the group differences between NEPA participants and potential coalition members for these variables were statistically significant ($p < .05$). Potential coalition members were more educated than the NEPA participants, with 62.7 percent of the former and 45.7 percent of the latter having a college degree or higher (see Table A-46). For two of the three efficacy questions, potential coalition members exhibited higher levels of political efficacy than the NEPA participants. For instance, twice as many NEPA participants (26.0%) than potential coalition members (13.7%) "strongly agreed" with the statement that people like me don't have a say in what government does (see Table A-47). Additionally, 28.8 percent of NEPA participants "strongly agreed" that politics is too complicated, compared to 17.6 percent of the potential coalition members (see Table A-48).

Fewer NEPA participants (67.6%) have attended a public meeting than potential coalition members (80.4%) (see Table A-49). Finally, almost twice as many potential coalition members (62.7%) were "very interested" in being involved in a watershed coalition than NEPA participants (34.7%) (see Table A-50). The reader should be reminded that the potential coalition members were defined as such because they indicated that they wanted to be involved in a watershed coalition in TVA's Norris Lake Watershed Survey. The fact that nearly nine out of ten (88.2%) indicated that were "very" or "moderately" interested in being a watershed coalition in the NEPA participant's survey provides further evidence of their resolve.

In summary, our main objective is to assess the degree to which the potential coalition members are representative of the watershed residents. For the most part, when statistical differences do exist, the potential coalition members are even less representative of the watershed residents than the NEPA participants. This evidence allows us to address a secondary research question. Of those individuals who are already civically engaged in resource management issues (as a NEPA participant), what characteristics partially determine wether or not someone would be interested in a watershed coalition – a form of participation much different and perhaps more demanding than attending a public meeting or filling out a survey. Evidence suggests that those with higher levels of education, higher levels of political efficacy, and experience at public meetings will be more interested in participating in a watershed coalition. The generalizability of this finding is limited, since most resource managers are not going to recruit coalition members from an existing pool of NEPA participants, unless as a last resort as was the case with the CPWT.

VI. Predictors of Citizen Participation

In the section that follows, we draw on data from factor analysis and two estimated logistic regression equations to determine whether or not hypothesized factors are significant predictors of two different forms of citizen participation.

A. Results of the Factor Analysis

Confirmatory factor analyses were used to test the unidimensional structure of the following constructs: new ecological paradigm, political efficacy, and trust in government. Questions for each scale were factor analyzed using a maximum likelihood solution with oblique rotation and list-wise deletion of missing values. The criteria of including factors with minimum eigenvalues of one or greater will be used for specifying acceptable factor structure (Kim and Mueller 1978). Items with factor loadings of .4 or higher for each factor will be subpooled to construct simple additive scales which will then be used in the estimated logistic regression equations. The data from the merged surveys are factor
analyzed.

1. Political Attitudes: As shown in Table 8, the questions for trust in government and political efficacy were factor analyzed together. The unidimensionality of political

Table 8: Maximum Likelihood Factor Analysis with Oblique Rotation of Political Attitudes

Items	Factor Pattern	
	Political Efficacy	Trust in Government
People like me don't have any say . . .	0.597	0.404
Politics are too complicated . . .	0.594	—
Public officials don't care . . .	0.705	0.454
Trust in Washington to do what is right. . . .	—	0.64
Government run for whom . . .	—	0.618
Government waste a lot of our taxes . . .	—	0.455
Eigenvalues (before rotation):	2.36	1.15
Percent variation explained	29.4	8.7
Factor correlation matrix	0.43	

efficacy and trust in government is confirmed.[10] The factor solution indicated a bifactorial structure with the first factor underlying the political efficacy questions and the second factor underlying the trust in government questions. However, two of the three political efficacy questions had factor loadings above .4 on the trust in government dimension. Additionally, the factor correlation matrix indicated that the two factors had a positive correlation of .43, suggesting that individuals with high political efficacy also have high levels of trust in government. Taken together, the two factors explain 38.1 percent of the variance. The eigenvalues for political efficacy and trust in government are 2.36 and 1.15, respectively.

The Cronbach's alpha, a measure of internal consistency, for the efficacy scale is .66 and the trust scale is .53. The fact that the alpha coefficients are perhaps less than satisfactory may be due to the sensitivity of Cronbach's alpha to the number of items loading on each factor. As such, low alphas may partially reflect the small number (three) of items underlying each factor (Carmines and Zeller 1979).

2. New Ecological Paradigm: The unidimensionality of the new ecological paradigm is not confirmed. The factor solution presented in Table 9 indicates a bifactorial structure. Dunlap *et al.* (2000) expanded the earlier NEP scale to include fifteen questions measuring five beliefs: (1) reality of growth, (2) anti-anthropocentrism, (3) fragility of nature's balance, (4) rejection of exemptionalism, and (5) possibility for

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The factor pattern and factor loadings that confirmed the political efficacy and trust in government constructs and informed the substantive interpretation of the new ecological paradigm was validated by a maximum likelihood factor analysis that used an orthogonal rotation.

Table 9: Maximum Likelihood Factor Analysis with Oblique Rotation of NEP Scale

Items	Factor Pattern	
	Pro-NEP	Anti-HEP
Approaching population limits . . .	0.733	—
Right to modify natural environment . . .	—	0.579
Human ingenuity . . .	—	0.514
Humans abusing environment . . .	0.488	—
Earth is like a space ship . . .	0.619	—
Human dominion over nature . . .	—	0.42
Humans will control nature . . .	—	0.503
Forthcoming ecological catastrophe . . .	0.635	—
Eigenvalues (before rotation):	2.45	1.52
Percent variation explained	22.6	10.8
Factor correlation matrix	0.28	

an ecological catastrophe. Our truncated version of this scale includes two questions measuring each of the above beliefs with the exception of 'fragility of nature's balance' belief. The items that loaded on the first factor measure beliefs regarding 'reality of growth' ('we are approaching the limit of the number of people the earth can support' and 'the earth is like a spaceship with very limited room and resources') and 'possibility for an ecological catastrophe' ('humans are severely abusing the environment' and 'if things continue on their present course, we will soon experience a major ecological catastrophe').

The items that loaded on the second factor measure beliefs regarding 'anti-anthropocentrism' ('humans have the right to modify the natural environment to suit their needs' and 'humans were meant to rule over the rest of nature') and 'rejection of exemptionalism' ('human ingenuity will insure that we do not make the earth unlivable' and 'humans will eventually learn enough about how nature works to be able to control it'). We will refer to the first factor as the "eco-crisis" scale and the second factor as the "anti-anthropocentrism" scale. Univariate statistics and the positive factor correlation of .27 indicate that both factors reflect an ecological view of the world. The Cronbach's alpha for the "eco-crisis" scale is .71 and for the "anti-anthropocentrism" scale is .58. Again, the alpha coefficients are lower than expected which may reflect the use of only four items for each scale. Simple additive scales[1] for the political efficacy, trust in government, eco-crisis, and anti-anthropocentrism scales will be introduced into the logistic regression model as IVs.

B. Logistic Regression Models

1. NEPA Participation: Table 10 presents the results of NEPA participation regressed on the four sociodemographic variables. The chi-square statistic (171.41; d.f. = 4) is significant, indicating that the four sociodemographic variables, as a set, reliably distinguished between NEPA participants and non-participants. The Nagelkerke R^2 indicates that the sociodemographic variables account for 37% of the variance. Additionally, the Wald statistic for each of the four variables indicates that education, income, age, and sex are significant ($\alpha \leq .001$ level) predictors of NEPA participation. Since each of the odds ratios (exp(b)) is more than 1.0, the results indicate that the relationships are in the expected direction; older people, males, people with more education, and the affluent have greater odds of being a NEPA participant.

The results in Table 10 indicate that when education increases by one unit (for instance from "some college" to a "college degree or more"), and the values of other independent variables remain constant, the log odds of being a NEPA participant increases by .719. Clearly, this is difficult to interpret substantively which is why most research reports odds ratios (Exp(b)). In other words, when education increases by one unit, the odds of being a NEPA participant are increased by a factor of 2.1. A one unit increase in household income increases the odds of being a NEPA participant by a factor of 1.76. Being a male increases the odds of being a NEPA participant by 2.57. A one year increase in age increases the odds of being a NEPA participant by 1.03 or by only 3%. The small odds ratio is due to the fact that respondents' ages ranged from 19 to 89 years.

Table 10: Results of Logistic Regression of NEPA Participation on Sociodemographic Characteristics

Independent Variables	*B*	S.E.	Wald	Exp(*b*)
Education	0.719	0.135	28.495***	2.052
Household Income	0.563	0.093	36.993***	1.756
Age	0.029	0.009	10.477***	1.03
Sex	0.945	0.254	13.888***	2.572
Constant	-7.735	0.762	103.166***	
Nagelkerke R^2	0.373			
N	624			

Notes: $\chi^2 = 171.409$ ($\alpha = .000$); d.f. = 4
* $\alpha \leq .05$; ** $\alpha \leq .01$; *** $\alpha \leq .001$

Table 11 presents the results of NEPA participation regressed on the full model, the four sociodemographic variables and the attitudinal variables. The chi-square statistic (164.91; d.f. = 9) is significant, indicating that the set of IVs reliably distinguished between NEPA participants and non-participants. The Nagelkerke R^2 of .431 indicates that the attitudinal variables explained 6% of variance, above that already explained by the sociodemographic variables. The Wald statistics indicates that political efficacy[11], eco-crisis, and anti-anthropocentrism are not significant predictors of NEPA

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In a separate analysis, the "NEPA participation" dependent variable was regressed on the full model with the individual indicators of trust in government and political efficacy entered in the model rather than the simple additive scales. None of the three political efficacy indicators were statistically significant predictors of NEPA participation.

Table 11: Results of Logistic Regression of NEPA Participation on the Full Model

Independent Variables	*B*	S.E.	Wald	Exp(*b*)
Education	0.634	0.167	14.436***	1.885
Household Income	0.491	0.108	20.703***	1.634
Age	0.031	0.011	7.933**	1.032
Sex	0.733	0.298	6.067*	2.082
Trust in Government	0.11	0.041	7.213**	1.116
Political Efficacy	0.04	0.046	0.776	1.041
Ecological Crisis	0.025	0.039	0.416	1.026
Anti-Anthropocentrism	0.044	0.038	1.323	1.045
Land/Water Use Freq.	0.315	0.041	15.146***	1.37
Constant	-10.303	1.284	64.401***	
Nagelkerke R^2	0.431			
N	520			

Notes: $\chi^2 = 164.911$ ($\alpha = .000$); d.f. = 9
* $\alpha \leq .05$; ** $\alpha \leq .01$; *** $\alpha \leq .001$

participation. Trust in government is a significant predictor[12] of NEPA participation; a one unit increase in trust in government increases the odds of being a NEPA participant by a factor of 1.12. Finally, people who frequently recreate in the NRW have greater odds of being a NEPA participant by a factor of 1.37.

Table 12 presents the results of interest in watershed coalition regressed on the four sociodemographic variables. The chi-square statistic (8.686; d.f. = 4) is not significant, indicating that the four sociodemographic variables, as a set, do not reliably distinguish between those who are interested in being a watershed coalition participant and those who are not. Notably, no single sociodemographic variable significantly increased the odds of being a watershed coalition participant.

Table 13 presents the results of coalition participation regressed on the full model, the four sociodemographic variables and the attitudinal variables. The chi-square statistic (55.488; d.f. = 9) is significant, indicating that, with the addition of the attitudinal variables, the set of IVs reliably distinguished between those are very interested in being a watershed coalition participant and those who are not.[13] The

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In a separate analysis, the "NEPA participation" dependent variable was regressed on the full model with the individual indicators of trust in government and political efficacy entered in the model rather than the simple additive scales. Of the three trust in government indicators, the only question that was statistically significant is the one that asked respondents if they would say that ". . . government is pretty much run by a few big interests looking out for themselves or that it is run for the benefit of all the people?" Believing that government is run for the benefit of all people increases the odds of being a NEPA participant by 1.11.

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In a separate analysis, the "interest in a watershed coalition" dependent variable was regressed on the full model with the individual indicators of trust in government and

Table 12: Results of Logistic Regression of Interest in Watershed Coalition on Sociodemographic Variables

Independent Variables	*B*	S.E.	Wald	Exp(*b*)
Education	0.045	0.1	0.205	1.046
Household Income	0.11	0.065	2.905	1.117
Age	0.011	0.006	2.917	1.011
Sex	0.14	0.181	0.598	1.15
Constant	-1.757	0.447	15.452***	
Nagelkerke R^2	0.02			
N	579			

Notes: $\chi^2 = 8.686$ ($\alpha = .069$); d.f. = 4
* $\alpha \leq .05$; ** $\alpha \leq .01$; *** $\alpha \leq .001$

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political efficacy entered in the model rather than the simple additive scales. None of the three political efficacy indicators or the three trust in government indicators were statistically significant predictors of "interest in a watershed coalition."

Table 13: Results of Logistic Regression of Interest in Watershed Coalition on the Full Model

Independent Variables	*B*	S.E.	Wald	Exp(*b*)
Education	-0.023	0.12	0.037	0.977
Household Income	0.073	0.075	0.961	1.076
Age	0.009	0.008	1.432	1.009
Sex	0.066	0.209	0.101	1.069
Trust in Government	0.036	0.032	1.331	1.037
Political Efficacy	0.047	0.035	1.799	1.048
Ecological Crisis	0.14	0.031	20.139***	1.15
Anti-Anthropocentrism	0.033	0.027	1.513	1.034
Land/Water Use Freq.	0.222	0.057	15.203***	1.248
Constant	-5.126	0.856	35.868***	
Nagelkerke R^2	0.147			
N	487			

Notes: $\chi^2 = 55.488$ ($\alpha = .000$); d.f. = 9
* $\alpha \leq .05$; ** $\alpha \leq .01$; *** $\alpha \leq .001$

Nagelkerke R^2 of .147 indicates that the attitudinal variables, as a set, explained almost 15% of the variance. The Wald statistics indicates that the eco-crisis construct and land use frequency are the only significant predictors of whether or not someone is interested in the watershed coalition. Adhering to an ecological worldview and the greater frequency in which one uses the public lands and waters in the NRW, the greater the odds that they will be very interested in a watershed coalition.

CHAPTER SEVEN

SUMMARY OF FINDINGS, IMPLICATIONS AND RECOMMENDATIONS

I. Introduction

In this chapter we present a summary of the findings in Chapters Five and Six. This chapter is divided into four sections. The first section examines if, and to what degree, the biophysical and social context of the Norris Reservoir Watershed (NRW) serves as a bridge and barrier to the Clinch-Powell Watershed Team's (CPWT) efforts to increase citizen participation in watershed management. The second section assesses efforts by TVA to reorganize its nonpower programs, and CPWT's efforts to promote greater interagency collaboration, and to increase the role of citizen participation in watershed management. The third section examines whether or not the NEPA participants and the potential coalition members are representative of those people whole live in the NRW. The fourth section analyzes the findings from the multivariate analysis. Evidence regarding the relative strength of a number of factors hypothesized to predict citizen participation is presented. At the end of each section, recommendations are provided to assist resource agencies in their efforts to increase the representativeness of NEPA participation, create representative watershed coalitions, and improve the representativeness of watershed coalitions once they have been formed.

II. Contextual Factors

We have argued that contextual factors may provide valuable insight regarding the bridges and barriers of implementing the watershed approach in the Norris Reservoir Watershed (NRW), and in Southern Appalachia more generally. In other words, we suggest that the process of implementing the watershed approach in general, and mobilizing citizens in particular, is partially impacted by the social and biophysical context of the NRW. The findings regarding contextual factors are explored in this section to assess what barriers constrained the CPWT's efforts to create a watershed coalition.

A. Biophysical Context

1. Finding: What are the barriers preventing 'average' citizens from participating in watershed management? There are two biophysical factors that help explain why a watershed coalition(s) did not form as quickly as the CPWT expected. First, prior research suggests that citizen mobilization occurs quickly when the environmental problem is a threat to individuals and communities. Citizens living in the arid and semiarid Southwest and West have actively mobilized and formed watershed coalitions to address the typically contentious issue of water scarcity and quality. However, the NRW is relatively pristine, water is relatively abundant, and water quality is fairly good. As such, watershed health, water quality and other water-related issues may not be salient for the average watershed resident. Second, the literature indicates that in regions where certain culturally-significant endangered species exist, citizens mobilize fairly quickly to ecosystem and watershed issues. The most endangered species in the watershed of the Clinch and Powell Rivers are a number of species of freshwater mussels. Mussels certainly do not strike a similar cultural chord in the NRW as do, for instance, endangered salmon in the northwest. Absent a crisis event, water scarcity, or a culturally-significant endangered species, citizens must be challenged to get involved to proactively maintain current levels of watershed health and to restore degraded areas.

The relatively healthy environmental conditions of the NRW may be important on another level. Most of the watershed residents have an experiential relationship with the biophysical environment. Additionally, the logistic regression analysis indicated that the more someone visits the public lands and waters as recreationists, the more likely they will participate in NEPA events and the more interest they have in being involved in a watershed coalition. The frequency of recreational use was the only variable that significantly predicted both forms of participation. Based on this evidence, we speculate that by increasing the number of recreational users and the frequency of use, TVA could increase the number of people willing to get involved in natural resource management issues. Yet, increasing the use of the public lands and waters may have a negative impact on water quality and aquatic health. The magnitude of this impact, though, will depend on what types of recreational activities agencies promote.

*2. **Recommendation***: Governmental agencies who have a stake in natural resource management in the NRW should sponsor a long-term educational program in which citizens have the opportunity to learn about the ecosystem management and the particular challenges of watershed management. The educational program should give citizens the opportunity to learn, given the current trends of population growth and increasing recreational use, what the environmental conditions of the NRW will be in 5, 10, and 20 years down the road. Citizens must understand that although certain endangered species, such as freshwater mussels, may not be culturally or recreationally significant, the mere fact that these species are on the endangered list is a crucial indicator of the overall degradation of ecosystem health.

Resource agencies should sponsor events on public lands to build a stronger relationship between watershed residents and the environment. Additionally, the agencies should try to increase recreational activity on the public lands and waters, but only those activities whose impact on the environment is minimal, such as non-motorized activities like walking/jogging, hiking, and swimming. The educational program described above may also include a session on the impact that certain activities have on the environment and ways in which recreational users can reduce this impact. The likely outcome of these events and activities would be an increase in the number of citizens willing to participate in natural resource management. Also, recreational users are in a prime position to directly observe the impacts of environmental degradation over time. Some recreationists, especially the more frequent users, could be recruited to collect data and monitor conditions.

B. Social Context

1. Sociodemographic Characteristics of Watershed Residents: The typical watershed resident is white, 52 years of age, and is a bit more likely to be a woman than a man. This individual is a Protestant, a high school graduate, is employed full-time, and has a total annual household income between $25,000 and $35,000. This person is a lifetime resident of East Tennessee, lives on a farm, ranch, or in open country in Campbell County, owns rural land, and has lived at their current residence for more than 10 years. Although, members of this household typically live in a rural or a semi-rural setting, most of them are not employed in farming, ranching, or in the natural resource extractive industry. They are also not employed in outdoor recreation, wildlife management, environmental protection, ecotourism, or any job that is based on natural amenities. The typical respondent votes in local elections, has middle-of-the-road political views (i.e., moderate Republican, moderate Democrat, or Independent), has never attended a public meeting held by a government agency such as the TVA, and is not an active member of a club, group, or organization dedicated to improve or protect the environment.

Residents living in the NRW do have some familiarity with the public lands and waters around Norris Lake area, since a large majority of them visited these areas during the last 12 months. They also participated in numerous recreational activities during these visits. The most popular activities included fishing, walking/jogging, and boating; the least popular activities included dirt biking, jet skiing, waterskiing, and canoeing/kayaking.

*2. **Findings – Education:*** Watershed residents have lower levels of education than the national population. Educational differences are even more notable when we recall that the watershed residents as a sample are more educated than the actual population. Existing research indicates that citizens who participate tend to have higher levels of education.

Recommendation: Influencing sociodemographic variables, such as primary school education, is no easy task since these variables are connected to complex, structural processes. Clearly, resource agencies do not have the resources to improve the general educational opportunities in the NRW. However, the educational program and sponsored events mentioned above could include activities that specifically target school-aged children. Resource agencies also could sponsor environment-related events conducted by local schools. The benefits of developing strong, positive relationships with local schools and children may be substantial in the long run. Although these efforts would not increase the educational level of the NWR residents per se, it would increase knowledge regarding watershed issues and the necessity of citizen involvement.

3. Findings – Environmental Concern: From the characteristics of the watershed residents, we can distill a number of defining characteristics that explain the likelihood of a watershed coalition emerging in the NRW. The high level of concern among watershed residents about national environmental conditions, the protecting public lands, and water quality is encouraging. This evidence is congruent with national surveys which increasingly find that environmental issues are very salient for all U.S. citizens. Furthermore, residents were more concerned about the negative impact of development on the quality of community life and fish and wildlife habitats than the positive impact of development on local economic growth. Since the watershed residents are already concerned about local environmental conditions and most actively interact with the environment, they do not need to be convinced that the environment is worthy of protection.

In other words, an excellent pool of potential citizen participants already exists in the NRW. Given the CPWT's difficulties in starting a watershed coalition, the question that comes to the fore is how do resource agencies reach these residents to convince them of the importance of citizen involvement in watershed management and necessity of organizing proactively to maintain and restore ecosystem health? How can the CPWT turn citizen concern for the environment into citizen involvement in watershed management?

Recommendation: The difference between indicating high levels of concern for the environment on a survey and actually volunteering time to participate is vast. Another focal point of the educational program should be to explain to the public the challenges that nonpoint source pollution poses and the necessity of citizen involvement to meet these challenges.

Citizens do not necessarily have to volunteer for an agency-driven project to have a positive impact on reducing the threat of nonpoint source pollution. For instance, agencies could provide an awareness of how environmentally sensitive behaviors at home would reduce nonpoint source pollution. For example, citizens could be encouraged not to dump used automobile oil into the ditch, to use fewer harmful pesticides on their lawn or garden, and not to clear land of trees and shrubs unless absolutely necessary.

4. Findings – Political Efficacy and Trust in Government: We found that compared to the national population and TVA participants, the watershed residents have lower levels of general political efficacy and trust in government. The reluctance of watershed residents to participate may partially be a function of their generally low levels of political efficacy and trust. Individuals with low political efficacy and trust are likely to believe that they have little influence on government and that they cannot trust government to be genuinely responsive to their needs. As such, participating in a decision-making process that is at least initiated by a governmental agency may seem to be a waste of time for a less efficacious and trusting individual.

Recommendation: There are a number of things that TVA and other agencies could do to improve citizen levels of political efficacy and trust. First, achieving the participatory goals of watershed management will likely increase levels of citizen efficacy and trust in local agencies. In turn, increasing citizen trust and efficacy, in the long-run, will create an active, engaged public in the NRW. We speculate that the reciprocal relationship between efficacy/trust and participation will, over time, break down the barriers to citizen participation in the NRW.

Second, agencies need to explain to citizens upfront that although a citizen-based, consensus-building process is being advocated, there are bureaucratic constraints and legislative mandates that rule-out certain policy options. For example, managing resources in a way that protects known endangered species will take precedence (due to the strong mandate of the Endangered Species Act) over other resource or non-resource problems, even if such problems are particularly important to citizens. Additionally, TVA should explain to citizens the relationship between its power and nonpower programs, and how this relationship impacts the (in)ability of the nonpower program's to address certain management issues, such as lake water levels. Those citizens who express frustration at public meetings may find solace in understanding the broader organizational context in which the 'off-limit' issues are situated. Agency forthrightness about existing bureaucratic constraints and legislative mandates that have an impact on management decisions will likely increase, or at least maintain, levels of political efficacy and trust.

*5. **Findings – Satisfaction with TVA:*** Another positive implication for TVA is that a majority of the watershed residents are generally satisfied with the job TVA is doing to protect and manage public lands and waters in the NRW. Additionally, a majority of the residents trust TVA to do the right thing when it comes to managing these public lands. These findings are surprising for two reasons. First, given the historical, well-documented contentious relationship between TVA and local communities, we would expect lower levels of satisfaction and trust in TVA. Second, watershed residents have considerably lower levels of political efficacy and moderately less trust in government than the U.S. citizens. As a result, we would expect that citizens also would have low levels of satisfaction and trust in TVA, which are substantively similar (but more localized) to the efficacy and trust constructs.

The finding regarding satisfaction with TVA does not support the claim that one reason why agencies are adopting more participatory forms of management is to rebuild legitimacy. The CPWT does not seem to be suffering from a legitimacy crisis in the

NRW. It is likely that the watershed residents' opinions about TVA as a political institution are complex. The satisfaction and trust questions asked specifically about TVA's ability to manage the public lands and waters. Citizens may make a distinction between TVA's power and nonpower programs. Some evidence suggests that citizens may also distinguish between TVA employees who actually working in the field and interact with citizens and TVA's upper management who primarily operate in elite political circles. For instance, a number of the citizens at the TVA/TDEC joint public meetings complained about TVA but then, as an afterthought, would indicate that their complaint was not directed at the CPWT. Perhaps TVA's upper management is advocating citizen participation to rebuild institutional legitimacy, while the CPWT is advocating to citizen participation to improve the effectiveness of watershed management.

We suggest that low levels of political efficacy and trust in government serve as barriers to mobilizing citizens to participate. The surprising finding regarding satisfaction with and trust in TVA compels one to speculate and, in this case, somewhat counter intuitively. Maybe citizens are not mobilizing partially because environmental conditions are good and TVA has been able to adequately manage public lands and waters in the past without their input. In other words, even though citizens indicated they are concerned about environmental issues, the watershed-as-environment may not be salient enough to motivate citizens to get involved.

Recommendation: Clearly, TVA must maintain existing levels of citizen satisfaction and trust, since these levels suggest that TVA is viewed as a legitimate resource agency in the NRW. It may be helpful for TVA to ascertain how they earned this satisfaction and trust in the first place. TVA should attempt to assess what management practices are most responsible for the degree to which citizens view TVA as legitimate. Such information may prove useful, especially given that TVA's nonpower programs are now funded by power generation rather than tax dollars and the looming issue of privatization.

Resource agencies must explain to citizens that due to the increased threat of environmental degradation (often not directly observable), dwindling federal dollars, and the particular challenges that nonpoint source pollution poses, citizen involvement is absolutely necessary if the natural resources of the NRW are going to be managed effectively. As stated earlier, this information could be disseminated through the educational program. Coupled with this educational program, resource agencies need to engage citizens in very specific, doable projects where citizens can directly see that their involvement made a difference.

III. Assessment of TVA's Efforts

One of the major purposes of this dissertation was to examine and evaluate the watershed approach being developed by the TVA and other government agencies in the Norris Lake Watershed Area (NRW) in East Tennessee. The TVA has tried to improve its management of public lands and waters through the (1) reorganization of its nonpower programs, (2) promotion of greater interagency cooperation and collaboration, and (3) increasing the role of citizen participation in watershed management. Our basic assessment of these early efforts by TVA to achieve these goals is generally favorable.

A. The Reorganization of TVA's Nonpower Programs

1. Findings: The participant observation data indicate that the reorganization of the nonpower programs has been positive for five reasons. First, reorganization reflects an institutional commitment to the canons of the watershed approach. Second, interdisciplinary and in-depth discussions about watershed issues seemed to occur on a daily basis among the CPWT. Third, the decentralized structure of the nonpower programs has enabled the CPWT to be accessible to recreational users, the general public and to people who live in the NRW. Fourth, the CPWT seems to possess a considerable degree of flexibility in responding to issues that arise in the watershed. Fifth, reorganization has allowed TVA to manage watersheds at multiple, hierarchically nested scales – one of the central tenets of the watershed approach.

2. Recommendation: Ultimately, the implications of reorganization will partially hinge on the success of adopting a watershed approach. Given that reorganization occurred less than two years ago and the initial successes noted above, we don't have much in way of recommendations. Our only suggestion regarding reorganization is that perhaps it did not go far enough. The managerial separation of the power and nonpower programs may reflect the historical legacy of TVA and energy production in the U.S., but it certainly does not reflect the current understanding of ecological systems and the hydrological cycle. Power production issues, such as the impacts of hydroelectric dams, coal mining, and nuclear plants, are dynamically linked to the current focus of nonpower programs, the adoption of the watershed approach whose goal is to maintain healthy ecosystems. The nonpower programs are now funded by profit generated by power production, which further clouds the relationship between the two programs.

B. Interagency Collaboration

1. Findings: Based on the two formal interagency meetings and subsequent informal interaction with the CPWT and other agency participants, we find that the implications of interagency collaboration are quite positive for at least four reasons. Conflict was minimal as most agency representatives agreed that interagency collaboration and increasing citizen participation are worthwhile goals. More specifically, agencies agreed to share biophysical data regarding the conditions of the NRW, promote citizen participation in the TVA/TDEC joint public meetings, and design an interagency website that explains the roles of each agency in the NRW and to provide citizen access data regarding the environmental conditions of the NRW.

There has been discussion about building an office and research facility in the NRW that would house all relevant resource agency staff who has management responsibilities in the watershed. Given the evidence collected thus far, interagency collaboration has served as a bridge to implementing the watershed approach.

2. Recommendation: One of the most notable outcomes of this process was the degree of interagency collaboration and perhaps, more important, the potential for future collaboration. We recommend that agencies continue to meet, independent of the success of the watershed coalition(s), on a regular basis to build on earlier collaborative efforts and to establish a long-term educational program. Some citizens or interest groups may not trust particular resource agencies because of a bad experience or agency-specific management practices. We suggest that if the agencies continue to collaborate and cooperate in an effort to effectively manage the natural resources in the NRW, agencies as a whole would seem more legitimate which might encourage citizens to participate in the long run.

C. Interagency Efforts to Mobilize Citizen Participation

1. Findings: Two separate informal meetings were held to generate interest in the Norris Watershed Coalition. Since most of the twenty-five citizens at each meeting were identified by the agency participants, many of the citizens represented organized stakeholder groups. The primary objective of these meetings was to get at least a few citizens to startup the watershed coalition. The CPWT had hoped that the watershed coalition would form shortly after the two informal meetings, but no one volunteered to take the lead.

Advertisements in local newspapers were used to notify citizens of the opportunity to participate in TVA's Norris Public Lands Plan and TDEC's Watershed Plan by attending the two joint public meetings. The primary purpose of the TVA/TDEC public meetings was to generate citizen involvement in public lands management. Citizens were clearly concerned about environmental degradation in the NRA and, in particular, the negative impact that such degradation would have on quality of life, property values, outdoor recreation, and tourism. Two questions were included in Norris Lake Watershed Survey that asked respondents to if they wanted to "be involved in a watershed coalition" and/or "help start a watershed coalition."

The CPWT then subcontracted with a nonprofit group to call each of the 80 individuals who answered "yes" to either of these questions to set up four separate watershed coalition meetings to be held in geographically dispersed locations in the NRW. Some evidence also suggests that rigid bureaucracies, such as TVA, can increase their institutional flexibility – a fundamental requirement of any ecosystem-based management approach – by subcontracting out work to nonprofit groups (Breckenridge 1999). By the end of July 2000, two watershed coalitions were in the process of being formed. The overall success of CPWT's efforts to increase citizen participation through watershed coalitions has yet to be determined.

On one hand, citizens were asked to participate in the NEPA-driven public meetings, a process familiar to many citizens, to address how TVA public lands should be managed in the NRW. On the other hand, citizens were encouraged to participate in the watershed coalition, a process foreign to most citizens, to address watershed issues on both public and private lands. In other words, citizens simultaneously were recruited for two completely different forms of participation. Inversely, the CPWT simultaneously was attempting to implement two different participatory processes, one typical of traditional natural resource management and the other a new process central to watershed management.

*2. **Recommendations:*** We recommend three possible alternatives. First, if agencies plan to recruit citizens both for NEPA-driven and collaborative processes, we suggest that they should be abundantly clear about what the respective roles are for citizens and agencies in each of the processes. This problem of role ambiguity may partially explain why citizens were reluctant to be involved in the watershed coalition, an unfamiliar form of participation. Second, the task of recruiting participants in the watershed coalition could be handed over to a non-profit organization from the beginning. This would more clearly demarcate NEPA-participation and the watershed coalition as separate processes. Additionally, a watershed coalition created through the efforts of a non-profit group would more likely be viewed as a legitimate institution, somewhat autonomous from the agencies and developers. Breckenridge (1999:699) suggests that "both government agencies and developers are looking to nonprofit organizations to mediate the relationship between economic and ecological functions by . . . implementing site-specific solutions well in advance of formal government proceedings to compel acquiescence."

Third, managing public lands and waters as if they were isolated and thus not impacted by private land use reflects political and legal considerations, not ecological processes. At the cost of sounding utopian, we suggest that if the watershed coalition, with widespread citizen participation and agency support, can effectively manage public and private lands, then the need for public land plans and NEPA participation becomes less relevant. In other words, if the principles of watershed management are fully realized in practice, then the role ambiguity is diminished since collaborative participation is the only form needed.

IV. Representativeness of Citizen Participation

Does widespread, representative citizen participation matter? As a democratic ideal, representativeness does matter. Since people who live in the watershed are not electing citizens to represent their interests in watershed management, it is incumbent on resource agencies to recruit participants who are representative of the watershed residents. Every watershed resident is a stakeholder and ideally should be involved in watershed management. Short of this lofty goal, those who do participate should be as representative of the watershed residents as possible. Additionally, the watershed approach attempts to maintain and restore water quality and aquatic health, in part, by lessening the impact of non-point source pollution. At a minimum, everyone living in the watershed is impacted by poor water quality and, in turn, may have an impact on aquatic health via their contribution to the problem of non-point source pollution.

A. Sociodemographic Differences

1. Findings: We found that NEPA participants were significantly different ($p < .05$) than the watershed residents for eight of the eleven sociodemographic variables we examined. Compared to watershed residents, NEPA participants were more likely to be male, slightly older, have a high income, working full time, retired, work in a job based on natural resource amenities, and live in a large city (100,000 or more); NEPA participants were less likely to be a homemaker, a lifetime resident of Eastern Tennessee, and live on a farm. Additionally, NEPA participants are more educated than the watershed residents. Notably, the potential coalition members were more educated than the NEPA participants and much more educated than watershed residents, with nearly two-thirds having a college degree or more.

The evidence strongly confirms the Hypothesis 1; NEPA participants are significantly more educated than the watershed residents. The NEPA participants also have higher levels of household income that watershed residents, thus supporting the Hypothesis 2. Those who participate in NEPA events have higher levels of socioeconomic status than watershed residents. As a result, those individuals who tend to benefit most from the economic system, males with high SES, also try to influence how natural resources are managed perhaps in part because they feel that they have more at stake and can affect decisions.

Another interesting finding is the gender difference between the two populations. Research on the grassroots movement has shown that if environmental problems are perceived as a health threat to children and/or communities, women mobilize more quickly than men (Davidson and Fruedenberg 1996). Yet, when the environmental issue is the management of public lands and waters, which is probably not perceived as a health issue, men are more likely to participate than women. An obvious explanation for this finding is that men use the public lands and waters more frequently than women. In other words, women participate in environmental issues to prevent harm to children and community health, while men participate to ensure continued access to public lands and waters for recreational purposes.

Recommendations: We were not surprised that NEPA participants and the potential coalition members were not representative of the watershed residents, but we were surprised at the degree of difference on so many of the sociodemographic variables. If resource agencies are committed to the goal of representative citizen participation, we suggest that watershed coalition members should not be recruited from NEPA events, even if it is politically and financially expedient. The central question now becomes what strategies could the CPWT employ to make the existing watershed coalitions more representative. These same strategies may be employed at the beginning of the recruitment process in future efforts to create watershed coalitions.

The educational program as described earlier would allow TVA and other agencies to generate participation from under-represented groups in the existing watershed coalitions and to ensure representativeness in future watershed coalitions. Water quality is a democratizing issue because it is a concern of virtually everyone and it has an impact on all individuals living in the watershed. As a result, the importance of the watershed approach in maintaining high water quality standards could be the central component of the educational program.

Second, specific components of outreach efforts could be developed that pertain directly to issues relevant to those segments of the population that are currently under-represented. The key is to help under-represented groups to (re)connect with the environment. Furthermore, the educational program may allow under-represented groups to understand better what resource issues are salient to them, the ways in which the watershed approach is suited to address those issues, and the necessity of their participation. For instance, outreach efforts targeted toward women's groups or places where women frequent could highlight how the watershed approach can prevent environmental problems that directly impact human health. The relevancy of particular issues to under-represented groups should be identified through further research.

B. Attitudinal and Behavioral Differences

1. Findings: Significant differences between watershed residents and NEPA participants also existed regarding attitudes and behaviors. More NEPA participants than watershed residents visited public lands and waters in the NRW in the last year, and they did so more frequently. Motor boating was much more popular among NEPA participants than watershed residents; fishing and walking/jogging was more popular among watershed residents than NEPA participants.

Furthermore, strong opposition against development among the TVA participants, compared to watershed residents, remained more consistent even when certain conditions for development would be ensured – such as, wildlife habitats not being threatened, quality of life not being degraded, or when private development was necessary to sustain local economic growth. In other words, NEPA participants are more strongly against the development of public lands than watershed residents, and their anti-development position is less conditional.

Overall, watershed residents and NEPA participants were satisfied with the job TVA was doing managing public lands and waters and trusted TVA to do the right thing. Providing strong evidence in support of Hypothesis 3; NEPA participants, compared to watershed residents, possess higher levels of political efficacy on all three questions. We found weak support for Hypothesis 4. While the data indicates that watershed residents are somewhat less trusting of government than NEPA participants, these differences are significant for only one of the three questions. For two of the three efficacy questions, potential coalition members exhibited higher levels of political efficacy than the NEPA participants and thus, much higher than watershed residents.

Compared to watershed residents, it was more likely that NEPA participants voted in local elections, attended a public meeting held by a local agency, and were active members of a club, group or organization that tries to improve or protect the environment. A significantly higher percentage of coalition members attended a public meeting than the NEPA participants. Generally, both groups were interested in participating in management issues facing the NRW. NEPA participants, however, were more interested than watershed residents in participating in efforts to improve fish and wildlife habitats on public lands in the NRW and being involved in a citizen-based watershed coalition. Almost twice as many potential coalition members were very interested in being involved in a watershed coalition than NEPA participants.

Recommendations: Given the degree and range of attitudinal differences between watershed residents and NEPA participants, our main recommendation is for resource agencies to conduct random sample telephone surveys of watershed residents as a tool for improving resource management, but also to recruit citizen participants that are representative of watershed residents. Using attitudinal data relevant to watershed issues may prove critical in increasing the representativeness of NEPA participation, creating representative watershed coalitions, and improving the representativeness of watershed coalitions once they have formed. Let me explain further why collecting attitudinal data, in addition to sociodemographic data, is necessary.

The sociodemographic characteristics of an individual are a manifestation of a lifetime's worth of accumulated experiences. As such, the sociodemographic characteristics of an individual will not be changed very easily. Specific attitudes and behaviors, however, are susceptible to change. Some examples may prove useful and will also serve as specific recommendations.

Without attitudinal data, we would not know why certain sociodemographic variables are good predictors of citizen participation. Resource agencies would not know, for instance, that one reason why people with high socioeconomic status (SES) are more likely to be participants is because they have higher levels of political efficacy than people with low SES (from an analysis not reported in this research). In an effort to increase the participation of people with low SES, agencies would find it easier to change, through outreach efforts, the level of political efficacy of nonparticipants than their socioeconomic status. If people with low SES have positive experiences with local agencies over an extended period time, their level of efficacy would likely increase and so too would the likelihood that they would participate in a watershed coalition.

Let me discuss another example. Based on our evidence we speculate that one reason why men are more likely to be NEPA participants than women, is because they use the environment (recreationally) more frequently, and thus have more at stake regarding management issues. While no outreach effort would change the gender of nonparticipants, resource agencies could sponsor programs that encourage women to engage in recreational activities which, in turn, would hopefully increase the likelihood that they would participate in a watershed coalition.

It is unrealistic to expect resource agencies to maximize the representativeness of participation by reducing all of the attitudinal and sociodemographic differences between watershed residents and those who typically participate. The question is on what sociodemographic variables and attitudes is representativeness critical for the effective management of watersheds. The answer to this question is context-specific. It depends on the conditions of the watershed, the sources of degradation, and the financial constraints of the resource agencies. However, armed with the data used in this dissertation, resource agencies would be able to make difficult decisions regarding where limited financial resources should be spent to increase citizen participation.

V. Predictors of Citizen Participation

The summary of findings from the multivariate analysis is presented in this section. We estimated logistic regression equations for two different forms of citizen participation. The first dependent variable we examined was NEPA participation. We found that the four sociodemographic variables, as a set, reliably distinguished between

NEPA participants and non-participants. Each of the four sociodemographic variables were significant predictors of NEPA participation; older people, males, people with more education, and the affluent have greater odds of being a NEPA participant. What is more, these variables remained statistically significant in the full model, after the attitudinal variable had been added.

One reason why educated people, males, older people, and the affluent are more likely to be NEPA participants may stem from the fact that these groups have higher levels of political efficacy. Thus, these groups would be more likely than less educated people, females, younger people, and the less affluent to assume that if they participated they could have an impact on environmental decision making. Another potential reason for the sex differences is that males are significantly more likely than females to use the public lands and waters in the NRW for recreational purposes, and they tend to do so more frequently. The issue of how public lands and waters should be managed in the NRW may simply be more salient for men than women, which might explain why they participate more. We found support for Sub-Hypothesis 1a. After controlling for the other variables in the model, more educated individuals have greater odds of being a NEPA participant. We also found support for Sub-Hypothesis 2a. Affluent individuals have greater odds of being a NEPA participant.

Entering the attitudinal variables in the full model increased the variance explained by an additional 6 percent. Political efficacy was not a significant predictor of NEPA participation. As such, we did not find support for Sub-Hypothesis 3a. This finding is perplexing given that the relationship between efficacy and NEPA participation was significant and strong in the bivariate analysis. Age, sex, education, and income are significantly related to political efficacy. It is likely that the explanatory power of political efficacy in the multivariate analysis is accounted for by these more robust sociodemographic variables. We did find support for Sub-Hypothesis 4a; the more someone has trust in government, the greater the odds that they will be a NEPA participant.

Neither of the two new ecological paradigm scales, eco-crisis and anti-anthropocentrism, were significant predictors of NEPA participation. As a result, we did not find support for Hypothesis 5. We assume that the environment, on some level, is salient to those people who participate in natural resource management. Apparently, their participation is not a function of adherence to an ecological world view. We did find evidence to support Hypothesis 6. The more someone uses the public lands and waters, the greater the odds that they will be a NEPA participant. Clearly, the environment and how it is managed is salient for people who use the public lands and waters recreationally.

The findings for coalition participation are markedly different. The four sociodemographic variables, as a set, do not reliably distinguish between those who are interested in being a watershed coalition participant and those who are not. Notably, no single sociodemographic variable significantly increased the odds of being a watershed coalition participant. With the addition of the attitudinal variables, the set of IVs reliably distinguished between those who are very interested in being in a watershed coalition participant and those who are not. In the full model, the set of independent variables explained almost 15% of the variance. Although the full model was quite weak, we did find support for Hypothesis 7. The only variables that significantly increased the odds of being interested in a watershed coalition are the eco-crisis construct and land use frequency. In other words, having an ecological worldview and frequently using the public lands and waters increases the odds of being interest in a watershed coalition.

The fact that commitment to an ecological worldview increases the odds of being interested in a watershed coalition, but not being a NEPA participant is notable. Based on participant-observation data from four public meetings, we suggest that most people who participate in NEPA events have an instrumental relationship with the environment. High levels of local environment concern and motivation to participate are a reflection of what the environment can offer – for example, recreational opportunities, high property values, and a good quality of life. Motivation to be involved in a watershed coalition as a reflection of an ecological worldview may not be instrumental, but rather stem from a more ecological or holistic understanding of the environment. Clearly this interpretation is speculative, but it suggest the need for further inquiry.

The fact that the sociodemographic variables were strong predictors of NEPA participation, but not interest in a watershed coalition deserves further attention. We offer two possible explanations. First, the model differences may reflect the fact that the two dependent variables are measured at different levels. NEPA participation is a behavioral measure, while coalition participation is a measure of behavioral intent. In other words, the disparate findings may not reflect substantive differences, but rather the difference between expressing interest in participating and actually participating.

Notably, the only variable that significantly increases the odds of being a NEPA participant and being interested in a watershed coalition is the frequency in which one recreates in the NRW.

The second explanation is that the differences between the two models are a function of the differences between the two forms of participation. On one hand, unlike NEPA participation, collaborative participation is a drawn out process, requiring a much greater commitment from the participant and more of their time and resources. In this sense, the two forms of participation are quantitatively different. On the other hand, collaborative participation is qualitatively different from NEPA participation, as it requires two-way interaction, consensus-building, power sharing, etc. We suggested that if citizens view the quantitative differences as the central distinction between the two forms of participation, then we would expect the same relationships hypothesized for NEPA participation, but the strength of the relationships should be greater for collaborative participation. If, however, the qualitative differences are central, we would expect the two models to be dissimilar. Assuming for the sake of discussion that the differences between the two models are not due to measurement issues, then the evidence from the logistic regression analyses suggests that citizens view the two forms of participation as qualitatively different. Unfortunately, since we do not have a behavioral measure of watershed coalition participation, we can only speculate as to what are the substantive differences between the two forms of citizen participation.

CHAPTER EIGHT

DISCUSSION AND CONCLUSION

This research documents the process through which the Tennessee Valley Authority (TVA) embarked on the transition from managing watersheds with a focus on water resources development to a more holistic, ecosystem-based watershed approach. The TVA's prototypical attempt to initiate this transition and the empirical basis of this research is captured in TVA's reorganization of its nonpower programs, and the Clinch-Powell Watershed Teams's (CPWT) efforts to promote greater interagency collaboration and to increase the role of citizen participation in watershed management. Although it is still early in a long-term process, the implications of reorganizing TVA's nonpower programs and interagency collaboration seem to be quite positive. In general, the CPWT efforts to generate citizen interest in the Norris Watershed Coalition were not as successful as they had hoped. As a result, the substantive focus of the dissertation shifted slightly from the bridges and barriers of watershed management to the barriers of creating a citizen-based watershed coalition. Based on this substantive shift, two empirical questions guided subsequent data collection and analysis.

First, if given the opportunity to participate, what factors partially determine whether or not, and to what degree, citizens will mobilize and get involved in ecosystem-based management of natural resources? This research argues that social processes unfolding in the NRW will be impacted, at some level, by the biophysical context of the

NRW. We identify two biophysical factors that help explain why a watershed coalition(s) did not form as quickly as the CPWT expected. First, the literature suggests that citizen mobilization occurs quickly when an environmental problem is a threat to individuals and communities. The NRW is relatively pristine, water is relatively abundant, and water quality is fairly good. As such, watershed health and water quality may not be salient issues for the average watershed resident. Second, citizens also mobilize fairly quickly around the endangerment of culturally-significant species. The most endangered species in the NRW are a number of species of freshwater mussels. Mussels, whose endangered status is indicative of declining aquatic health, certainly do not strike a similar cultural chord in the NRW as do, for instance, endangered salmon in the northwest or manatees in Florida. Absent a crisis event, water scarcity, or a culturally-significant endangered species in the NRW, agencies face the arduous task of mobilizing citizens to proactively maintain current levels of watershed health and to restore degraded areas.

We also contend that the process of implementing the watershed approach in general, and mobilizing citizens in particular, is partially impacted by the social context of the NRW. On one hand, compared to the U.S. population, watershed residents have lower levels of education, household incomes, political efficacy, and trust in government. Given evidence from existing research, all four of these factors would likely serve as barriers to increasing citizen participation in the NRW. On the other hand, watershed residents have some familiarity with the public lands and waters in the NRW, as most of them experience the environment through a number of different recreational activities. The watershed resident's experiential relationship with the environment and their high levels of environmental concern would likely have a positive impact on efforts to increase citizen participation. Unfortunately, we were unable to directly test the relationships described above. Nonetheless, all social processes are embedded in a particular context. Thus, omitting contextual factors from analyses treats social processes as if they operate in isolation, disembedded from their surroundings.

Second, what are the characteristics of citizens that tend to participate in natural resources management and how do these individuals compare to the population impacted by management decisions? A common critique of NEPA-driven participation is that those who participate have higher socioeconomic status than average citizens. We found support for this critique. Those who participate in NEPA events tend to have higher levels of income and education. What is more, we also found significant differences between NEPA participants and watershed residents on numerous attitudes and behaviors pertinent to watershed issues and participation in the NRW – for example, types of recreational activities, the development of public lands, political efficacy, trust in government, and civic engagement.

Does it matter if most of the public input utilized to inform resource management is from relatively wealthy, educated males? If we consider public lands and waters to belong to the public (by definition), then all citizens should have a say in how they are managed. If agencies spend time and money to recruit average citizens, as did the CPWT, and those citizens who do participate are still not representative, what is the next step? Put differently, should agencies continue to spend limited resources to ensure the representativeness of citizen participation? This question is related to a broader question that is central to this research. What factors explain why natural resource agencies are democratizing decision making processes by encouraging not only an increased level of citizen involvement, but also alternative forms of participation? Based on extensive literature reviews drawn from many disciplines, we argue that widespread and representative citizen participation is necessary for political economic and natural resource science reasons.

First, from a political economic perspective, we suggest that the recent trend of promoting public participation in environmental decision-making partially reflects an attempt by natural resource agencies to regain citizen trust and institutional legitimacy. In turn, the willingness of citizens to participate with governmental agencies in environmental decision-making is partially a function of their trust in government and degree of political efficacy. In the bivariate analysis, we found that citizens who participated in NEPA events had much higher levels of political efficacy and moderately higher levels of trust in government than watershed residents. In the multivariate analysis, we found trust in government to be a moderate predictor of NEPA participation. Political efficacy, however, was not a significant predictor of NEPA participation in the multivarate analysis, once the sociodemographic variables (education, income, age, and gender) were entered into the model. Thus, the variance explained by political efficacy is also collectively explained by the four sociodemographic variables.

We suggest that agencies can increase levels of political efficacy and trust in government by promoting authentic participation, and thus begin to rebuild loss legitimacy. It is worth noting that for agencies to encourage the creation of citizen-led watershed coalitions creates an awkward paradox. Agencies are essentially using a top-down approach to encourage bottom-up citizen mobilization. Yet, without agency encouragement citizens simply may not mobilize when no crisis event exists. As such, it is imperative that in order to meet the participatory goals of ecosystem-based approaches agency representatives and citizens must rethink their respective roles and ways of interacting when it comes to resource management. The CPWT was sensitive to this paradox, but ultimately circumvented it by hiring a nonprofit agency to encourage citizens to form watershed coalitions. With the nonprofit agency taking the lead, the process itself appeared less agency-driven and perhaps more grassroots or bottom-up.

Second, we explored the scientific underpinnings of the necessity to increase citizen participation. Based on the thesis of Funtowics and Ravetz (1992), we contend that the problem-solving strategies of traditional natural resource management – applied science and professional consultancy – were adequate at addressing the technical and methodological problems of uncertainty. However, the uncertainty that accompanies new environmental problems (e.g., global warming, technological disasters, and nonpoint source pollution) and ecosystem-based approaches have revealed the inadequacy of traditional science. The strategic purpose of post-normal science is not to reduce uncertainty, but rather to make better decisions in a world of irreducible uncertainties.

Post-normal science hinges on the formation of an "extended peer community" in which discourse occurs among all stakeholders impacted by a problem. In this arena, science is but one of many sources of evidence, which together inform decisions made by the extended peer community. With a focus on watershed issues, we extend Funtowics and Ravetz's thesis by suggesting that the post-normal environmental problems that traditional science failed to resolve includes nonpoint source pollution and that the watershed coalition, as an extended peer community, can be viewed as the post-normal solution. The role of citizen participation in natural resource management is central to this research. Moreover, we suggested that the long-term effectiveness of ecosystem-based approaches partially hinges on the ability resource agencies to mobilize citizens to participate in watershed coalitions and other forms of participation.

While citizen participation is an important piece of the puzzle, it is only one piece. In an effort to more fully understand the bridges and barriers to ecosystem-based approaches, we asked another broad question. What historical and contemporary factors underlie the profound shift in how natural resources are managed, a shift from traditional natural resource management to ecosystem-based approaches to management? Most generally, this transition reflects the historical legacy of the progressive conservation movement, utilitarianism, multiple-use and sustained yield, the modern environmental movement, and the wave of environmental legislation during the 1970s. Furthermore, the ad hoc, incremental nature of environmental legislation suggests that rapid change and a wholesale shift to ecosystem-based approached is perhaps possible at the management philosophy level, but unlikely at the level of practice.

The current structure of natural resource management is an outcome of a historically-specific, fragmented and incremental method of addressing natural resource problems. As new environmental challenges arose, Congress would enact laws to address these problems, delegating responsibility to existing or new agencies. The process of implementing an ecosystem-based approach is embedded in a broader context that reflects current conditions and the historical legacy of natural resource management. As such, the transition from traditional natural resource management to an ecosystem-based approach is not a discreet historical break from one approach to the next, but rather within this transition some facets of management (from philosophies to field techniques) will cease, some will endure, and some will be (re)created. These facets may serve as both bridges and barriers to the effective implementation of an ecosystem-based approach.

More specifically, historic changes occurred in the late 1960s and early 1970s, changes that completely altered the contours of natural resource management. Without the guidance of an organic statute, natural resource agencies must attempt to meet the cogent, but lofty goals of ecosystem-based approaches by relying on existing environmental legislation. In this case, environmental legislation, as a whole, can be viewed as a barrier, since the fragmented and *ad hoc* character of legislation is incongruent with the implementation of a comprehensive, integrated, holistic approach to management. Yet, four legislative adaptions have served as bridges to ecosystem-based approaches.

First, laws were enacted that explicitly forced agencies to manage for non-consumptive (or, at least, less consumptive) uses – such as, recreation, preservation, ecological, aesthetic, and spiritual uses. As a result, the strict utilitarian adherence by resource agencies to the multiple-use approach – interpreted as management toward the sustained yield of a single, market-oriented resource – had come to an end. This reflects a shift of managing land for one dominant value at the exclusion of others to managing land based on the view that multiple values are legitimate. Acknowledging the legitimacy of multiple values is a necessary step toward consensus-based, collaborative decision making. Second, a more intrinsic rights perspective was reflected in the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973. The legal recognition that protecting endangered species requires the protection of the habitats in which they live is significant, as it indirectly fosters a more systemic ecosystem approach.

Third, the National Environmental Policy Act (NEPA) of 1969 dramatically increased the role of citizen participation in agency decision making and promoted greater interagency collaboration. The participatory framework created by NEPA (albeit problematic) may serve as the foundation upon which the collaborative decision making models can be built. Fourth, legislation that encouraged a more systemic management perspective (e.g., the Forest and Range Renewable Resources Planning Act of 1974, the National Forest Management Act of 1976, Federal Land Policy and Management Act of 1976 and the Endangered Species Act of 1973) provided the procedural foundation for natural resource science to move beyond a sole reliance on scientific reductionism and discipline-specific analyses. A systemic perspective, which is fundamental to the effective implementation of ecosystem-based approaches, requires interdisciplinary analyses across mediums, species, and scales.

The particular ecosystem-based approach we are interested in is watershed management or the watershed approach. Despite the four legislative adaptations outlined above, three barriers to watershed management are notably significant. First, the challenge of implementing a new comprehensive management approach within the tangled web of environmental legislation is particularly daunting when the management focus is on watershed issues. Historically, water resource development and management has been fragmented based on institutional jurisdictions - federal, regional (e.g., TVA), state, and substate levels. Relatedly, institutional responsibility for different, but hydrologically interconnected, aspects of watershed issues – such as, water quality, water supply, surface water, and groundwater – have also been fragmented and managed as separate issues. The current knowledge of the dynamic interconnections among resource media within and across watersheds is incongruent with the fragmented structure of agencies responsible for water resources management. Thus, the effectiveness of a holistic watershed approach must reconnect and integrate the issues of water quality, water quantity, surface water and groundwater on an institutional level.

Second, a paradox exists between the trend of devolution and the principle that watersheds should be managed at multiple, hierarchically nested scales. On one hand, by transferring power to states and local government, devolution has potentially enabled watershed management to occur more effectively at smaller scales. On the other hand, the systemic perspective of watershed management necessitates that management occurs at larger scales, such as the river basin level. The emphasis on management at multiple scales evokes the tension between choosing a bottom-up, decentralized approach or a top-down, centralized approach to decision making. The principles of watershed management, however, suggest the need for both the top-down and bottom-up approaches, an institutional structure that TVA has recently adopted. The concomitant trends of devolution and privatization are posing a threat to the ability of agencies to manage watersheds at larger scales. Paradoxically, the existence of regional river basin institutions (such as, TVA and the Northwest Power Planning Council) is undermined, if current trends continue, precisely at a time when the need for watershed management at multiple scales is increasingly recognized.

Third, the post-normal problem of nonpoint source pollution represents a pivotal challenge that any resource management approach must overcome to prevent the continued degradation of ecosystems. The history of water resources management in the United States can be simplified as a transition from a sole focus on water resources development (such as, flood control, navigation, and power production) to a broader focus on the maintenance of water quality by regulating point and nonpoint sources of pollution. The persistent problems of declining water quality, degradation of watershed health, and threatened aquatic and terrestrial species, despite the relatively effective regulation of point source pollution, have moved nonpoint source pollution to center stage in the 1980s and 1990s, and into the 21st Century. We speculate that the relative success or failure of watershed management, or any other approach, hinges on its ability to effectively control nonpoint source pollution, which includes the expanding role of the public in watershed management.

Despite the above barriers to watershed management, we argue that the watershed approach is a rigorous and practical approach to addressing contemporary environmental problems for three reasons. First, the watershed approach simplifies the complex problems associated with defining and choosing the appropriate geographic scale(s) of management. Choosing watersheds as the unit or scale of management is advantageous because they are meaningful ecologically, defined spatially, and can be nested hierarchically. Second, current ecological conditions provide support for the management at the level of watersheds, since aquatic species and aquatic-based ecosystems are more threatened than their terrestrial counterparts. Third, defining ecosystems by watershed boundaries may encourage more citizens to participate than when ecosystems are defined in other ways – such as, the habitat of an endangered species or a stand of old growth forest. This is partially because rivers, lakes, and other bodies of water often constitute a special place for individuals and communities. Additionally, virtually everyone is concerned about water quality. Thus, watershed managers can ideally frame ecosystem issues in ways conducive for getting citizens involved.

We conclude this chapter with a brief discussion regarding the contributions of this dissertation. First, one of the main goals of this research is to provide useful data and analysis that will assist TVA and other resource agencies to better manage natural resources in the Tennessee Valley. Toward this end, we have assessed TVA efforts to implement a watershed approach, examined the representativeness of NEPA participation and the potential representativeness of the watershed coalitions in the NRW, identified the bridges and barriers to implementing the watershed approach in the NRW, and provided extensive literature reviews regarding natural resource management, water resources management, and citizen participation. Additionally, specific recommendations are provided to assist resource agencies in their efforts to increase the representativeness of NEPA participation, create representative watershed coalitions, and improve the representativeness of watershed coalitions once they have been formed. Finally, the usefulness of random sample telephone surveys of watershed residents is illustrated.

Second, this research contributes to an emerging area of study referred to as human dimensions of natural resource management. As it became widely recognized that the canons of traditional natural resource management were ill-suited to address post-normal environmental problems, the historically constructed barriers separating the natural sciences from the social science began to crumble. As the inter- and trans-disciplinary characteristics of contemporary environmental problems becomes increasingly apparent, social science perspectives are accepted in arenas that were exclusively occupied by the natural sciences. Ecosystem-based approaches explicitly advocate for collaboration between the social and physical scientists, and community groups. This research takes advantage of this new found acceptance by demonstrating the theoretical, methodological, and policy level contribution of the social sciences to the study of natural resource management. More research needs to be conducted to further legitimize the role of social scientists in natural resource management.

Third, this research, as with other studies on the human dimensions of natural resource management, contributes to environmental sociology by broadening the range of its substantive focus. Sociology partially emerged to explain the profound impact that industrialization had on individuals and communities; environmental sociology emerged to explain the profound impact that the negative byproducts of industrialization, environmental degradation, are having on individuals and communities. Much of the environmental sociological research has focused on what Kroll-Smith, Couch, Marshall (1997) refers to as "extreme environments" – that is, environments that narrow the range of what people know about their physical world while simultaneously intensifying their need to protect themselves. Extreme environments provided significant opportunities for sociological analysis, since the ensuing conditions of individual and communities stress compress social processes into an atypically brief time-span; expose usually concealed institutional behavior to observation and examination; and reveal and magnify aspects of social systems and processes that are typically obscured by the routinization of everyday life.

Thus, while research examining extreme environments allow us to better understand the effects of increasing environmental degradation on individuals and communities, it also enables an examination of broader social processes that often escapes observation in non-extreme environments. The environment-society relationship is particularly pronounced in extreme environments. As such, the main substantive foci of environmental sociology have been the study of the underlying causes of extreme environments and how individuals and communities respond to extreme environments. Perhaps the study of extreme environments enabled environmental sociology to legitimize itself as a subdiscipline within sociology, but the environment-society relationship is sufficiently complex to warrant a broader and more fully specified examination. For instance, the environment-society relationship is manifest, although not as pronounced, in nonextreme environments. Recreational users and resource managers often develop strong relationships with nonextreme environments, such as the nation's public lands and waters.

The substance of environmental legislation and statutes, natural resource agency philosophies and mission statements, and resource management practices elucidate how societies, communities, and individuals view their relationship with the environment. Natural resource agencies are embedded in a broader social-context, and public lands managers serve as more than just stewards of land, but also as individuals charged with maintaining the ongoing relationship between natural resources and society. The recent paradigm shift in natural resource management, with an increased role for arguably authentic public participation, has provided an excellent opportunities for social scientist studying the environment and participatory processes.

Advocates have argued that approaches such as ecosystem management and sustainable development have moved beyond the entrenched "environmental protection versus economic development" mentality, and offer the real potential for protecting the environment and maintaining economic development. Increased citizen participation is viewed as a necessary component of these approaches. Skeptics argue, on the other hand, that ecosystem management and sustainable development amount to nothing more than utopian buzzwords that gloss over the continued destruction of the environment. Citizen participation from this view is simply a more subtle form of cooptation. Regardless of which position one takes, the fact remains that ecosystem management and sustainable development are being operationalized as management strategies. These approaches give researchers an opportunity to better understand the relationship between the environment and communities in a proactive, consensual context where collective efforts are geared toward the prevention of an extreme environment. Although this dissertation contributes to the areas of environmental policy, human dimensions of natural resource management, and environmental sociology, it should also be viewed as a call for future research.

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APPENDICES

APPENDIX A

FREQUENCY TABLES

Table A-1: Age

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
18 to 34	14.9	2.0	2.0
35 to 49	29.6	34.6	32.0
50 to 64	32.5	38.6	42.0
65 and over	23.0	24.8	24.0
N	643	156	50

Note: Main cell entries are percentages
* Difference between NEPA Participants and Watershed Residents is significant at the $p < .05$ level

Table A-2: Gender

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
Females	52.6	22.4	82.4
Males	47.4	77.6	17.6
N	643	156	51

Note: Main cell entries are percentages
* Difference between NEPA Participants and Watershed Residents is significant at the $p < .05$ level

Table A-3: Education

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
Less than H.S.	20.6	.6	0.0
H.S. diploma	41.5	20.5	13.7
Some college	24.8	27.6	23.5
College degree +	13.1	51.3	62.7
N	636	156	51

Note: Main cell entries are percentages
* Difference between NEPA Participants and Watershed Residents is significant at the p < .05 level

Table A-4: Type of Employment

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
Homemaker	14.8	1.9	2.0
Retiree	27.0	39.4	40.0
Full time	41.1	54.2	52.0
Part time	6.1	3.2	4.0
Unemployed	1.6	0.0	0.0
Student	1.6	1.3	2.0
N	640	155	50

Note: Main cell entries are percentages
* Difference between NEPA Participants and Watershed Residents is significant at the p < .05 level

Table A-5: Employed in Resource Extraction Industries

Response Categories	Watershed Residents	NEPA Participants	Potential Coalition Members
Yes	18.0	16.0	15.7
No	82.0	84.0	84.3
N	643	156	51

Note: Main cell entries are percentages

Table A-6: Employed in Natural Amenities

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
Yes	5.0	13.5	16.0
No	95.0	86.5	84.0
N	643	155	50

Note: Main cell entries are percentages

* Difference between NEPA Participants and Watershed Residents is significant at the $p < .05$ level

Table A-7: Household Income

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
< $15K	21.0	3.8	2.3
$15K-$25K	18.4	3.0	4.7
$25K-$35K	19.4	11.3	11.6
$35K-$50K	20.4	19.5	25.6
$50K-$75K	13.9	27.8	27.9
$75K or greater	6.9	34.6	27.9
N	495	133	43

Note: Main cell entries are percentages
* Difference between NEPA Participants and Watershed Residents is significant at the $p < .05$ level

Table A-8: Own Rural Land

Response Categories	Watershed Residents	NEPA Participants	Potential Coalition Members
Yes	59.3	58.1	60.8
No	40.7	41.9	39.2
N	643	156	51

Note: Main cell entries are percentages

Table A-9: Type of Current Residence

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
Farm	49.4	36.0	35.4
Town, < 1K	4.6	8.2	12.5
1K to 5K	15.5	16.4	10.4
5K to 10K	10.7	10.3	14.6
10K to 25K	10.7	8.2	10.4
25K to 50K	8.2	4.1	6.3
50K to 100K	.7	.7	2.1
More than 100K	.2	15.8	8.3
N	607	146	48

Note: Main cell entries are percentages
* Difference between NEPA Participants and Watershed Residents is significant at the $p < .05$ level

Table A-10: Length of Current Residence

Response Categories	Watershed Residents	NEPA Participants	Potential Coalition Members
< 5 years	20.6	24.4	31.4
5 to 10 years	22.3	17.3	23.5
10 to 20 years	20.6	16.0	17.6
20 + years	36.5	42.3	27.5
N	643	156	51

Note: Main cell entries are percentages

Table A-11: Lifetime Residency in East Tennessee

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
Yes	70.5	54.5	47.1
No	29.5	45.5	52.9
N	643	156	51

Note: Main cell entries are percentages
* Difference between NEPA Participants and Watershed Residents is significant at the $p < .05$ level

Table A-12: Visit Public Lands

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
Yes	70.3	96.8	96.1
No	29.7	3.2	3.9
N	639	155	51

Note: Main cell entries are percentages
* Difference between NEPA Participants and Watershed Residents is significant at the $p < .05$ level

Table A-13: Number of Visits to Public Lands

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
Less than 5	29.4	10.7	10.2
6 to 12	25.8	18.8	18.4
13 to 24	10.3	12.8	8.2
25 to 52	11.7	17.4	16.3
More than 52	22.9	40.3	46.9
N	446	149	49

Note: Main cell entries are percentages
* Difference between NEPA Participants and Watershed Residents is significant at the $p < .05$ level

Table A-14: Types of Activities on Public Lands

Response Categories[a]	Watershed Residents	NEPA Participants	Potential Coalition Members
Walking/Jogging	15.5	1.4	2.0
Hiking	1.3	5.4	4.1
Scenic Driving	5.6	.7	0.0
Swimming	7.6	8.8	16.3
Motor Boating	14.4	40.5	32.7
Fishing	35.1	23.6	26.5
Hunting	2.0	5.4	4.1
N	445	148	49

Note: Main cell entries are percentages
[a] Activities were included if 5 percent or more of any of the three populations engaged in this activity.

Table A-15: Concern for National Environment

Response Categories	Watershed Residents	NEPA Participants	Potential Coalition Members
Very concerned	59.8	67.1	62.5
Moderately conc.	37.2	26.3	33.3
Moderately unconc.	2.0	5.3	4.2
Very unconcerned	1.0	1.3	0.0
N	643	156	48

Note: Main cell entries are percentages

Table A-16: Importance of Clean Water

Response Categories	Watershed Residents	NEPA Participants	Potential Coalition Members
Very important	95.9	100	100
Somewhat important	3.9	0.0	0.0
Somewhat unimport.	.2	0.0	0.0
Not at all important	0.0	0.0.	0.0
N	643	156	51

Note: Main cell entries are percentages

Table A-17: Concern for Public Lands

Response Categories	Watershed Residents	NEPA Participants	Potential Coalition Members
Very concerned	66.9	72.1	80.0
Moderately conc.	30.9	24.0	18.0
Moderately unconc.	1.7	1.9	0.0
Very unconc.	1.5	1.9	2.0
N	643	154	50

Note: Main cell entries are percentages

Table A-18: Public Lands Should Be Protected

Response Categories	Watershed Residents	NEPA Participants	Potential Coalition Members
1. Strongly agree	83.9	91.0	94.1
2. Mildly agree	11.4	5.8	3.9
3. Not sure	2.7	.6	0.0
4. Mildly disagree	.6	1.3	2.0
5. Strongly disagree	1.4	1.3	0.0
N	643	156	51

Note: Main cell entries are percentages

Table A-19: Public Lands Should Be Open to Development

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
1. Strongly agree	5.8	2.6	2.0
2. Mildly agree	13.6	12.3	7.8
3. Not sure	14.2	3.2	2.0
4. Mildly disagree	17.8	14.2	21.6
5. Strongly disagree	48.5	67.7	66.7
N	639	154	51

Note: Main cell entries are percentages
* Difference between NEPA Participants and Watershed Residents is significant at the $p < .05$ level

Table A-20: Public Lands Open to Development, If Fish and Wildlife Habitats Not Threatened

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
1. Strongly agree	36.6	23.4	25.5
2. Mildly agree	28.8	25.3	37.3
3. Not sure	6.8	1.9	0.0
4. Mildly disagree	8.3	12.3	15.7
5. Strongly disagree	19.5	37.3	21.6
N	640	154	51

Note: Main cell entries are percentages
* Difference between NEPA Participants and Watershed Residents is significant at the $p < .05$ level

Table A-21: Public Lands Open to Development, If Necessary to Sustain Growth

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
1. Strongly agree	16.6	5.9	4.1
2. Mildly agree	34.1	29.4	26.5
3. Not sure	11.9	3.9	8.2
4. Mildly disagree	14.4	13.1	20.4
5. Strongly disagree	23.0	47.7	40.8
N	639	153	49

Note: Main cell entries are percentages
* Difference between NEPA Participants and Watershed Residents is significant at the p < .05 level

Table A-22: Public Lands Open to Development, If No Threat to Quality of Life

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
1. Strongly agree	44.2	26.6	28.0
2. Mildly agree	23.8	24.0	28.0
3. Not sure	5.5	2.5	4.0
4. Mildly disagree	7.5	7.8	14.0
5. Strongly disagree	19.1	39.0	26.0
N	640	154	50

Note: Main cell entries are percentages
* Difference between NEPA Participants and Watershed Residents is significant at the p < .05 level

Table A-23: Satisfaction with TVA

Response Categories	Watershed Residents	NEPA Participants	Potential Coalition Members
Very satisfied	16.7	19.4	17.6
Somewhat satisfied	46.4	46.5	45.1
Neither	11.2	5.8	7.8
Somewhat dissatisfied	18.7	21.9	23.5
Very dissatisfied	7.0	6.5	5.9
N	643	156	51

Note: Main cell entries are percentages

Table A-24: Frequency of Trust in TVA

Response Categories	Watershed Residents	NEPA Participants	Potential Coalition Members
Just about always	11.1	9.3	6.3
Most of the time	42.2	47.7	52.1
Some of the time	37.9	39.1	37.5
Almost never	8.9	4.0	4.2
N	643	156	48

Note: Main cell entries are percentages

Table A-25: Political Views

Response Categories	Watershed Residents	NEPA Participants	Potential Coalition Members
Conservative Repub.	19.8	23.1	25.5
Moderate Republican	17.1	23.1	23.4
Independent	29.6	28.0	27.7
Moderate Democrat	25.3	19.6	19.1
Liberal Democrat	8.2	6.3	4.3
N	643	156	47

Note: Main cell entries are percentages

Table A-26: Political Efficacy – People Like Me Don't Have a Say in What Government Does

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
1. Strongly Agree	38.5	21.9	13.7
2. Mildly Agree	24.4	30.3	29.4
3. Neither	3.8	1.3	2.0
4. Mildly Disagree	17.3	30.3	37.3
5. Strongly Disagree	16.0	16.1	17.6
N	636	155	51

Note: Main cell entries are percentages
* Difference between NEPA Participants and Watershed Residents is significant at the $p < .05$ level

Table A-27: Political Efficacy – Politics Too Complicated

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
1. Strongly Agree	55.5	25.2	17.6
2. Mildly Agree	25.7	29.0	27.5
3. Neither	2.5	.6	2.0
4. Mildly Disagree	7.7	25.2	29.4
5. Strongly Disagree	8.6	20.0	23.5
N	638	155	51

Note: Main cell entries are percentages
* Difference between NEPA Participants and Watershed Residents is significant at the $p < .05$ level

Table A-28: Political Efficacy – Public Officials Don't Care About People Like Me

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
1. Strongly Agree	52.0	30.3	19.6
2. Mildly Agree	27.0	32.9	41.2
3. Neither	4.2	3.2	3.9
4. Mildly Disagree	12.4	23.9	29.4
5. Strongly Disagree	4.4	9.7	5.9
N	638	155	51

Note: Main cell entries are percentages
* Difference between NEPA Participants and Watershed Residents is significant at the $p < .05$ level

Table A-29: Trust in Washington To Do What Is Right

Response Categories	Watershed Residents	NEPA Participants	Potential Coalition Members
Just about always	2.4	.6	0.0
Most of the time	13.5	16.2	16.0
Some of the time	55.7	63.0	64.0
Almost never	28.4	20.1	20.0
N	630	154	50

Note: Main cell entries are percentages

Table A-30: Government Run For a Few Big Interests or Benefit of All

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
Few big interest	85.6	77.1	78.0
Benefit of all	14.4	22.9	22.0
N	562	131	41

Note: Main cell entries are percentages

* Difference between NEPA Participants and Watershed Residents is significant at the $p < .05$ level

Table A-31: Government Waste the Money We Pay in Taxes

Response Categories	Watershed Residents	NEPA Participants	Potential Coalition Members
A lot of it	81.2	73.9	69.4
Some of it	18.0	25.5	28.6
Don't waste much	.8	.6	2.0
N	632	153	49

Note: Main cell entries are percentages

Table A-32: Vote In Local Elections

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
Yes	79.4	88.5	92.2
No	20.6	11.5	7.8
N	640	156	51

Note: Main cell entries are percentages

* Difference between NEPA Participants and Watershed Residents is significant at the $p < .05$ level

Table A-33: Attend Public Meetings

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
Yes	27.1	71.8	80.4
No	72.9	18.2	19.6
N	638	156	51

Note: Main cell entries are percentages
* Difference between NEPA Participants and Watershed Residents is significant at the $p < .05$ level

Table A-34: Member of an Environmental Group

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
Yes	14.7	45.5	49.0
No	85.3	54.5	51.0
N	639	156	51

Note: Main cell entries are percentages
* Difference between NEPA Participants and Watershed Residents is significant at the $p < .05$ level

Table A-35: Interest in Improving Recreational Management

Response Categories	Watershed Residents	NEPA Participants	Potential Coalition Members
1. Very interested	39.0	41.7	43.1
2. Moderate interested	30.4	37.1	33.3
3. Slightly interested	16.0	11.3	13.7
4. Not all interested	14.5	9.9	9.8
N	605	151	51

Note: Main cell entries are percentages

Table A-36: Interest in Improving Fish and Wildlife Habitats

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
1. Very interested	41.2	46.8	41.2
2. Moderate interested	28.6	35.1	47.1
3. Slightly interested	14.1	13.0	7.8
4. Not all interested	16.2	5.2	3.9
N	612	154	51

Note: Main cell entries are percentages

* Difference between NEPA Participants and Watershed Residents is significant at the $p < .05$ level

Table A-37: Interest in Being Involved in a Watershed Coalition

Response Categories	Watershed Residents	NEPA* Participants	Potential Coalition Members
1. Very interested	29.4	44.1	62.7
2. Moderate interested	26.7	28.9	25.5
3. Slightly interested	19.1	15.1	7.8
4. Not all interested	24.8	11.8	3.9
N	581	152	51

Note: Main cell entries are percentages

* Difference between NEPA Participants and Watershed Residents is significant at the $p < .05$ level

Table A-38: Household Income – U.S. Population and Watershed Residents

Response Categories	U.S. Population	Watershed Residents
Less than $15K	24.2	21.0
$15K - $25K	14.1	18.4
$25K - $35K	10.9	19.4
$35K - $50K	18.3	20.4
$50K - $75K	15.8	13.9
$75 or greater	16.7	6.9
N	1219	495

Note: Main cell entries are percentages

Table A-39: Education – U.S. Population and Watershed Residents

Response Categories	U.S. Population	Watershed Residents
1. Less than H. S.	13.2	20.6
2. H.S. diploma or equivalent	30.3	41.5
3. Some college	28.7	24.8
4. College degree +	27.8	13.1
N	1276	636

Note: Main cell entries are percentages

Table A-40: Political Efficacy I – U.S. Population and Watershed Residents

Response Categories	U.S. Population	Watershed Residents
1. Strongly agree	13.1	38.5
2. Somewhat agree	27.3	24.4
3. Neither	11.9	3.8
4. Somewhat disagree	35.3	17.3
5. Strongly disagree	12.3	16.0
Mean	3.06	2.48
N	1272	636

Note: Main cell entries are percentages

Table A-41: Political Efficacy II – U.S. Population and Watershed Residents

Response Categories	U.S. Population	Watershed Residents
1. Strongly agree	25.2	55.5
2. Somewhat agree	45.8	25.7
3. Neither	7.2	2.5
4. Somewhat disagree	12.8	7.7
5. Strongly disagree	8.9	8.6
Mean	2.34	1.88
N	1274	638

Note: Main cell entries are percentages

Table A-42: Political Efficacy III – U.S. Population and Watershed Residents

Response Categories	U.S. Population	Watershed Residents
1. Strongly agree	15.2	52.0
2. Somewhat agree	44.8	27.0
3. Neither	13.0	4.2
4. Somewhat disagree	22.8	12.4
5. Strongly disagree	4.1	4.4
Mean	2.56	1.90
N	1274	638

Note: Main cell entries are percentages

Table A-43: Trust in Government I – U.S. Population and Watershed Residents

Response Categories	U.S. Population	Watershed Residents
1. Just about always	3.2	2.4
2. Most of the time	36.7	13.5
3. Some of the time	58.6	55.7
4. Never	1.5	28.4
N	1270	630

Note: Main cell entries are percentages

Table A-44: Trust in Government II – U.S. Population and Watershed Residents

Response Categories	U.S. Population	Watershed Residents
1. Few big interests	66.7	84.0
2. Benefit of all	33.3	16.0
N	1209	562

Note: Main cell entries are percentages

Table A-45: Trust In Government III – U.S. Population and Watershed Residents

Response Categories	U.S. Population	Watershed Residents
1. Waste a lot	61.8	79.7
2. Waste some	34.8	19.5
3. Don't waste much	3.4	.8
N	1267	632

Note: Main cell entries are percentages

Table A-46: Education – NEPA Participants and Potential Coalition Members

Response Categories	NEPA* Participants	Potential Coalition Members
Less than H.S.	1.0	0.0
H.S. diploma	23.8	13.7
Some college	29.5	23.5
College degree +	45.7	62.7
N	105	51

Note: Main cell entries are percentages

* Difference between NEPA Participants and Potential Coalition Members is significant at the $p < .05$ level

Table A-47: Political Efficacy I – NEPA Participants and Potential Coalition Members

Response Categories	NEPA* Participants	Potential Coalition Members
1. Strongly Agree	26.0	13.7
2. Somewhat Agree	30.8	29.4
3. Neither	1.0	2.0
4. Somewhat Disagree	26.9	37.3
5. Strongly Disagree	15.4	17.6
N	104	51

Note: Main cell entries are percentages
* Difference between NEPA Participants and Potential Coalition Members is significant at the $p < .05$ level

Table A-48: Political Efficacy II – NEPA Participants and Potential Coalition Members

Response Categories	NEPA* Participants	Potential Coalition Members
1. Strongly Agree	28.8	17.6
2. Somewhat Agree	29.8	27.5
3. Neither	0.0	2.0
4. Somewhat Disagree	23.1	29.4
5. Strongly Disagree	18.3	23.5
N	104	51

Note: Main cell entries are percentages
* Difference between NEPA Participants and Potential Coalition Members is significant at the $p < .05$ level

Table A-49: Attend Public Meetings – NEPA Participants and Potential Coalition Members

Response Categories	NEPA* Participants	Potential Coalition Members
Yes	67.6	80.4
No	32.4	19.6
N	104	51

Note: Main cell entries are percentages
* Difference between NEPA Participants and Potential Coalition Members is significant at the p < .05 level

Table A-50: Interest in Being Involved in a Watershed Coalition – NEPA Participants and Potential Coalition Members

Response Categories	NEPA* Participants	Potential Coalition Members
1. Very interested	34.7	62.7
2. Moderately interested	30.7	25.5
3. Slightly interested	18.8	7.8
4. Not all interested	15.8	3.9
N	101	51

Note: Main cell entries are percentages
* Difference between NEPA Participants and Potential Coalition Members is significant at the p < .05 level

APPENDIX B

SURVEY INSTRUMENT

TELEPHONE INTERVIEW SCRIPT

A1 GROUP Name and ID # [0 = Watershed Residents; 2 = TVA Participants]
A2 Please enter zip code of respondent **{Only TVA PARTICIPANTS}**
A3 Please enter city or town name of respondent **{Only TVA-PARTS.}**

[INTERVIEWER-IF A YOUNG CHILD ANSWERS ASK FOR AN ADULT]

Hello, my name is ________________, and I'm calling from the Social Science Research Institute at the University of Tennessee.

We are conducting important research on issues that affect your COMMUNITY and NORRIS LAKE.

The UNIVERSITY sent you a letter describing the study and asking if you would VOLUNTEER a few minutes of YOUR HOUSEHOLD' S time to help us conduct this important research.

Q1. Do you remember getting this letter?

1. Yes
2. No--> **[INTERVIEWER READ]** *"I'm sorry but it was a brief letter to let you know we would be calling.*

8. Not Sure--> **[INTERVIEWER READ]** *"I'm sorry but it was a brief letter to let you know we would be calling.*

9. Refused

Q2. To do this research scientifically, I will need to talk with the person who is currently living in your household who is 18 years of age or OLDER, who had the most recent birthday.

Would that be you or someone else?

1. Self -----> Skip to Q3
2. Someone else

[INTERVIEWER: ASK TO SPEAK TO THAT PERSON]
[IF THAT PERSON IS NOT AT HOME, ASK THE RESPONDENT WHEN WOULD BE A GOOD TIME TO CALL THEM BACK AND ASK THEM FOR THE PERSON'S FIRST NAME]

Hello, my name is ________________, and I'm a researcher calling from the UNIVERSITY OF TENNESSEE.

I am helping the UNIVERSITY OF TENNESSEE conduct important research on issues that affect your COMMUNITY and NORRIS LAKE.

The UNIVERSITY sent your household a letter describing the study and asking if you would VOLUNTEER a few minutes of your time to help it conduct this important research.

Q3. I want to stress to you that this interview is completely voluntary. All of the information you provide will remain confidential and your name will not appear on the interview.

You may also end the interview at any time and you may skip over any questions that you prefer not to answer.

May I begin?

1. Yes ----> Skip to Q9
2. No, not a convenient time ---> Skip to Q4
3. No, bad health ---> Skip to Q5
4. No, too old ---> Skip to Q6
5. No, feel inadequate ---> Skip to Q7
6. No other ---> Skip to Q8

Q4. No, not a convenient time

[READ] SORRY to have caught you at a bad time. It only takes a few minutes but I would be happy to call back.

1. Will do it now ---> Skip to Q9
2. Call back

[READ] When would be a good time to call in the next day or so? Can I get your first name so that I know who to ask for?

99. Refusal **[INTERVIEWER: TERMINATE AS REFUSAL]**

Q5. No, bad health

[READ] I am sorry to hear that. I would be happy to call back in a day or so . . . would that be OK.

1. Will do it now ---> Skip to Q9
2. Ok - Call Back

[READ] When would be a good time to call in the next day or so? Can I get your first name so that I know who to ask for?

99. Refusal **[INTERVIEWER: TERMINATE AS REFUSAL]**

Q6. No, too old

[READ] Older person's opinions are just as important to this research as anyone else's. For the survey to be scientific, we have to be sure that seniors have as much a chance to give their opinion as anyone else does. We really want your opinion, OK?

1. OK, will do ---> Skip to Q9
99. Refusal **[INTERVIEWER: TERMINATE AS REFUSAL]**

Q7. No, feel inadequate

[READ] The questions are not at all difficult. Some of the people we already interviewed had the same concern as you have, but once we got started they did just fine. Maybe I could read a few questions to you so you can see what they are like, OK?

1. OK - will do ---> Skip to Q9
99. Refusal **[INTERVIEWER: TERMINATE AS REFUSAL]**

Q8. No other

[READ] Maybe I could read just a few questions to you so you can see what they are like. OK.

1. Ok -will do ---> Skip to Q9
99. Refusal **[INTERVIEWER: TERMINATE AS REFUSAL]**

Q9. First, do you think it is VERY important, SOMEWHAT important, somewhat UNimportant, NOT AT ALL IMPORTANT that the water is clean in the lakes, rivers and creeks that make up the NORRIS LAKE WATERSHED area, OR are you unsure.

1. Very important
2. Somewhat important
3. Somewhat unimportant
4. Not at all important
8. Unsure

9. refused

Q10. Are you VERY concerned, MODERATELY concerned, moderately UNconcerned, VERY unconcerned about the environmental quality of public lands and waters in the NORRIS LAKE WATERSHED area, OR are you unsure?

1. Very concerned
2. Moderately concerned
3. Moderately unconcerned
4. Very unconcerned
8. Unsure

9. refused

Q11. Are you VERY concerned, MODERATELY concerned, moderately UNconcerned, VERY unconcerned about ENVIRONMENTAL ISSUES facing the nation, OR are you unsure?

1. Very concerned
2. Moderately concerned
3. Moderately unconcerned
4. Very unconcerned
8. Unsure

9. refused

Q12. Have you visited any PUBLIC LANDS or WATERS in the NORRIS LAKE WATERSHED area in the last 12 months.

1. No ---> Skip to Q15
2. Yes

8. not sure
9. refused

Q13. Have you visited them, 5 times or less in the last 12 months, 6 to 12 times, 13 to 24 times, 25 to 52 times, or MORE than 52 times in the last 12 months?

1. 5 times or less [Please note change from SSRI program]
2. 6 to 12
3. 13 to 24
4. 25 to 52
5. More than 52

8. not sure
9. refused

Q14. What SINGLE activity did you do there the most in the last 12 months? [CODE RESPONSE]

1. walking/jogging
2. hiking
3. [Left Blank]
4. bicycling
5. scenic driving
6. wildlife viewing
7. photographing
8. canoeing/kayaking
9. picnicking
10. swimming
11. camping
12. motor boating
13. waterskiing
14. jet skiing
15. dirt biking, ATV or other off-road motor driving
16. [Left Blank]
17. fishing
18. hunting
19. other
88. not sure
99. refused

Q15. How much influence do you think people like you can have over decisions affecting these public lands if they attend public meetings . . . would you say it is a LOT, a MODERATE AMOUNT, A LITTLE, or NONE AT ALL

1. A lot
2. A moderate amount
3. A little
4. None at all

8. not sure
9. refused

Q16. How satisfied are you with the job TVA has done at protecting and managing public lands and waterways in the Norris Lake Watershed area. Would you say you are . . .

1. Very Satisfied
2. Somewhat Satisfied
3. Neither Satisfied nor Dissatisfied
4. Somewhat Dissatisfied
5. Very Dissatisfied

8. not sure
9. refused

Q17. How much of the time do you think you can trust the TVA to do what is right when it comes to managing public lands and waterways in the Norris Lake Watershed area, would you say it is JUST ABOUT ALWAYS, MOST OF THE TIME, ONLY SOME OF THE TIME, OR ALMOST NEVER?

1. Just about always
2. Most of the time
3. Only some of the time
4. Almost never

8. not sure
9. refused

Next, I am going to list several activities associated with public lands in NORRIS LAKE WATERSHED AREA. Please tell me if you would be VERY interested, MODERATELY interested, SLIGHTLY interested, or NOT AT ALL interested in participating in each one.
The first one is . . .

Q18. Helping to improve fish and wildlife habitats on public Lands in the Norris Watershed area?

Would you be VERY interested, MODERATELY interested, SLIGHTLY interested or NOT AT ALL interested in __________?

1. Very Interested
2. Moderately Interested
3. Slightly Interested
4. Not at all Interested

8. not sure
9. refused

Q19. Helping to improve recreational management on public Lands in the Norris Watershed area?

Q20. Being involved in a citizen-based, watershed coalition that would be supported by government agencies to help address natural resource issues?

Q20b. Participating in a citizen-based, watershed coalition supported by the TVA AND OTHER GOVERNMENT AGENCIES that would address natural resources issues in the Norris Watershed area?

{Only TVA-PARTS}

Q20c. Did you know that the TVA and OTHER GOVERNMENT AGENCIES actually are in the process of creating a citizen's-based watershed coalition that would address natural resource issues in the Norris Watershed area.

{Only TVA-PARTS}

1. Yes
2. No

9. refused

Q20d. What is the probability of you actually volunteering to become a member of this citizen-based Watershed Coalition. Would you say the probability was VERY HIGH, MODERATELY HIGH, NEITHER HIGH nor LOW, MODERATELY LOW, or VERY LOW.

{Only TVA-PARTS}

1. Very High
2. Moderately High
3. Neither High or Low ------->Skip to Q20f
4. Moderately Low ------->Skip to Q20f
5. Very Low ------->Skip to Q20f

8. not sure
99. refused

Q20e Briefly, what would be your most important reason for JOINING the Norris Watershed Citizen's Coalition?

{Only TVA-Parts}

____

____

Q20f Briefly, what would be your most important reason for NOT JOINING the Norris Watershed Citizen's Coalition?

{Only TVA-PARTS}

____

____

Q21. Is there any group or organization that CURRENTLY represents your views on public land issues that affect the Norris Lake Watershed area?

1. Yes
2. No

8. not sure
9. refused

I am going to list organizations involved in public land issues that affect the NORRIS LAKE WATERSHED area. For each one, please tell how much of the time you think they would reflect your views on these issues. The first one is . . .

Q22. STATE WILDLIFE AND CONSERVATION AGENCIES

Would you say that they reflect your views on these issues JUST ABOUT ALWAYS, MOST OF THE TIME, ONLY SOME OF THE TIME, OR ALMOST NEVER?

1. Just about always
2. Most of the time
3. Only some of the time
4. Almost never

8. not sure
9. refused

Q23. The TVA
Q24. DEVELOPERS
Q25. CIVIC AND BUSINESS ASSOCIATIONS
Q26. LOGGING AND MINING INTERESTS
Q27. FARMERS AND RANCHERS
Q28. LOCAL LANDOWNERS
Q29. LOCAL ENVIRONMENTAL GROUPS
Q30. JET SKIERS **{Only Watershed Residents}**
Q31. BOATERS
Q32. FISHERMEN and HUNTERS
Q33. CAMPERS and HIKERS
Q34. OR ANOTHER RECREATIONAL GROUP **{Only Watershed Residents}**

Next, please tell me whether you STRONGLY agree, MILDLY agree, ARE UNSURE, Mildly DISAGREE, STRONGLY disagree with each of the following statements about private development on public lands in the NORRIS LAKE WATERSHED area. The first one is . . .

Q35. Public lands in the Norris Lake Watershed area SHOULD BE open to private development.

Do you STRONGLY agree, MILDLY agree, are UNSURE, mildly DISAGREE, strongly DISAGREE that _________

1. Strongly Agree
2. Mildly Agree
3. Unsure
4. Mildly Disagree
5. Strongly Disagree

9. refused

Q36. Public lands in the Norris Lake Watershed area should be open to private development ONLY IF it is necessary to sustain local economic growth.

Q37. Public lands in the Norris Lake Watershed area should be open to private development ONLY IF it does not threaten fish and wildlife habitat.

Q38. Public lands in the Norris Lake Watershed area should be open to private development ONLY if it does not degrade the quality of life in the surrounding communities.

Q39. Public lands in the Norris Lake Watershed area should be PROTECTED to preserve the environment.

Next, please tell me whether you STRONGLY agree, MILDLY agree, are UNSURE, Mildly DISAGREE, STRONGLY disagree with each of the following statements about the relationship between humans and the environment. The first one is . . .

Q40. We are approaching the limit of the number of people the earth can support.

Do you STRONGLY agree, MILDLY agree, are UNSURE, mildly DISAGREE, strongly DISAGREE that _________

1. Strongly Agree
2. Mildly Agree
3. Unsure
4. Mildly Disagree
5. Strongly Disagree

9. refused

Q41. Humans have a right to modify the natural environment to suit their needs.
Q42. Human ingenuity will insure that we do NOT make the earth unlivable.
Q43. Humans are severely abusing the environment.
Q44. The earth is like a spaceship with very limited room and resources.
Q45. Humans were meant to rule over the rest of nature.
Q46. Humans will eventually learn enough about how nature works to be able to control it.
Q47. If things continue on their present course, we will soon experience a major ecological catastrophe.

I am going to list values that motivate people. Please tell me how important each value is at motivating you, on a scale where 1 is extremely important, and 5 is not important at all. The first one is . . .

{Only Watershed Residents}

Q48. To have control or dominance over people and resources

1. Extremely Important
2.
3.
4.
5. Not at all important

8. not sure
9. refused

Q49. To preserve and enhance the welfare of people who I know
Q50. To appreciate and protect the welfare of all people and nature
Q51. To have personal success and achievement
Q52. To obtain personal pleasure and gratification
Q53. To conform to social expectations and norms
Q54. To accept the customs and ideas that traditional cultures and religions provide.
Q55. To be safe and secure, in myself, my relationships, and in the country.
Q56. To acquire independent thinking and action
Q57. To be exposed to new things and new challenges

Next, please tell me whether you STRONGLY agree, MILDLY agree, ARE UNSURE, Mildly DISAGREE, STRONGLY disagree with each of the following statements about the GOVERNMENT

Q58. People like me don't have any say about what the government does.

1. Strongly Agree
2. Mildly Agree
3. Unsure
4. Mildly Disagree
5. Strongly Disagree

9. refused

Q59. Sometimes politics and government seem so complicated that a person like me can't really understand what's going on.

1. Strongly Agree
2. Mildly Agree
3. Unsure [
4. Mildly Disagree
5. Strongly Disagree

9. refused

Q60. I don't think public officials care much about what people like me think.

1. Strongly Agree
2. Mildly Agree
3. Unsure
4. Mildly Disagree
5. Strongly Disagree

9. refused

Next, I would like to know more about your views about the government.

Q61. How much of the time do you think you can trust the government in Washington to do what is right. Would you say it is JUST ABOUT ALWAYS, MOST OF THE TIME, ONLY SOME OF THE TIME, OR ALMOST NEVER?

1. Just about always
2. Most of the time
3. Only some of the time
4. Almost never

8. not sure
9. refused

Q62. Would you say the government is pretty much run by a FEW BIG INTEREST looking out for themselves, OR that is it run for the BENEFIT OF ALL PEOPLE?

1. Run by a few big interests
2. Run for the benefit of all

8. not sure
9. refused

Q63. Do you think people in government waste a LOT of money we pay in taxes, waste SOME of it, or DON'T WASTE VERY MUCH of it?

1. A lot
2. Some
3. Not very much

4. not sure
5. refused

Q64. Do you think that QUITE A FEW people running the government are crooked, NOT VERY MANY are crooked, OR do you think HARDLY ANY are crooked?

1. Quite a few
2. Very many
3. Hardly any

8. not sure
9. refused

The last few questions are about you and your household. Please be assured that YOUR RESPONSES will be KEPT STRICTLY CONFIDENTIAL and will only be used to compare groups of people.

Q65. Are you a life long resident of East Tennessee?

1. Yes----> skip to Q75
2. No

8. not sure
9. refused

Q66. What year did you move to East Tennessee _______?
(Only Watershed Residents)

8. not sure
9. refused

Q66b. Where you born in East Tennessee?

{Only Watershed Residents}

1. No
2. Yes

8. not sure
9. refused

Q66c. How many years did you live in East Tennessee **before you moved away?**

{Only Watershed Residents}

-------- Number of years

88 not sure
99 refused

Q66d. How many years did you live away from East Tennessee **before you moved back?**

{Only watershed Residents}

------- Number of years

88. not sure
99. refused

I am going to list a few reasons why people move to East Tennessee. For each one, please tell me if it was a Very Important, Somewhat Important, Neither Important or Unimportant, Somewhat Unimportant or Very Unimportant. The first one is . . .

Q67. To be closer to relatives and friends.

{Only Watershed Residents}

Was this a ____________ reason for moving to East Tennessee?

1. Very Important
2. Somewhat Important
3. Neither Important or Unimportant
4. Somewhat Unimportant
5. Very Unimportant

8. not sure
9. refused

Q68. For its culture, people, and way of life.
Q69. For its natural environment.
Q70. For economic and employment reasons.
Q71. Because it had less urban sprawl and development.

Q72. Which of the following reasons was the MOST IMPORTANT REASON for moving to East Tennessee? Was it . . .

{Only Watershed Residents}

1. To be closer to relatives and friends.
2. For its culture, people, and way of life.
3. For its natural environment.
4. For economic and employment reasons.
5. Because it had less urban sprawl and development.

6. some other reason.
8. not sure
9. refused

Q73. What state and county did you live in RIGHT BEFORE you moved to East Tennessee?

{Only Watershed Residents}

------State
------County

Q74. Which of the following BEST describes where you lived right before you moved to East Tennessee?

{Only Watershed Residents}

1. On farm, ranch or in open country
2. In a town or a small city with less than 25,000 people

3. In a city with between 25,000 and 50,000 people
4. In a city with between 50,000 and 250,000 people
5. In a metro area with between 250,000 to 500,000 people
6. In a metro area with between 500,000 to 1 million people
7. In a metro area with more than 1 million people

8. not sure
9. refused

Q74b. Which of the following **BEST** describes where you live in the **MOST, before** you returned back to East Tennessee.

{Only Watershed Residents}

1. On a farm, ranch, or in open country
2. In a town or a small city with less than 25,000 people
3. In a city with between 25,000 and 50,0000 people
4. In a city with between 50,000 and 250,000 people
5. In a metro area with between 250,000 to 500,000 people
6. In a metro area with between 500,000 to 1 million people
7. In a metro area with more than 1 million people.

8. not sure
9. refused

Q75. Which of the following best describes where you currently live?

1. On a farm, ranch or in open country
2. In a town of less than 1,000 people
3. In a town with between 1,000 and 5,000 people
4. In a town with between 5,000 and 10,000 people
5. In a city with between 10,000 and 25,000 people
6. In a city with between 25,000 and 50,000 people
7. In a city with between 50,000 and 100,000 people
8. In a city with more than 100,000 people

88. not sure
99. refused

Q75b. Which County do you currently live in?

1. Anderson County
2. Campbell County
3. Claiborne County
4. Grainger County

5. Hancock County
6. Hawkins County
7. Union County
10. Knox **{Only TVA-PARTS}**
11. Blount **{Only TVA-PARTS}**
12. Sevier **{Only TVA-PARTS}**
13 Other (Specify)__________ **{Only TVA-PARTS}**

8. not Sure
9. refused

Q76. Have you lived at your CURRENT address for . . .

1. LESS THAN 5 YEARS
2. 5 TO 10 YEARS
3. 10 TO 20 YEARS
4. OR MORE THAN 20 YEARS
8. not sure
9. refused

Q77. Do you own any rural land in East Tennessee?

1. Yes
2. No ----> Skip to Q79

8. not sure
9. refused

Q78. How many acres do you own _________

8888. not sure
9999. refused

Q79. Do you USUALLY vote in LOCAL elections?

1. Yes
2. No

8. not sure
9. refused

Q80. Have you ever attended a public meeting or a forum held by a government agency such as the TVA?

1. Yes
2. No

8. not sure
9. refused

Q81. Are you, or anyone else in your household, an active member in a club, group or organization that tries to improve or protect the NATURAL ENVIRONMENT?

1. Yes
2. No

8. not sure
9. refused

Q82. I am going to read a number of employment categories and would like for you to describe which one best fits your situation. Would you consider yourself as . . .

1. A HOMEMAKER
2. A RETIREE
3. A STUDENT
4 WORKING FULL TIME
5. WORKING PART-TIME
6. UNEMPLOYED

7. other
8. not sure
9. refused

Q83. Are you, or any member of your household, employed in farming, ranching, timber, mining or any natural resource extractive industry.

1. Yes
2. No

8. not sure
9. refused

Q84. Are you, or any member of your household, employed in outdoor recreation, wildlife management, environmental protection, ecotourism, or any job that is based on natural amenities?

1. Yes

2. No

8. not sure
9. refused

Q85. What is your year of birth ______

8888. not sure
9999. refused

Q86. What is the highest level of education you have completed?

[INTERVIEWER: CODE RESPONSES INTO THE FOLLOWING CATEGORIES]

1. Less than high school <u>diploma</u>
2. High school diploma, GED or equivalent
3. Some college (include vocational, trade or junior college graduate)
4. College degree or greater

8. not sure
9. refused

Q87. I am going to read a list of income categories. Please tell me which category best describes the total amount of income received by your household in 1998. Please stop me when I get to the right category.

[READ CATEGORIES UNTIL RESPONDENT STOPS YOU]

The first one under $15,000 dollars

The next one is ________________

1. UNDER $15,000 dollars
2. $15,000 to $24,999 dollars
3. $25,000 to $34,999 dollars
4. $35,000 to $49,999 dollars
5. $50,000 to $74,999 dollars
6. $75,000 or MORE dollars

8. not sure
9. refused

Q88. Which of the following BEST describes your POLITICAL views?

Would it be . . .

1. A CONSERVATIVE REPUBLICAN
2. A MODERATE REPUBLICAN
3. AN INDEPENDENT
4. A MODERATE DEMOCRAT
5. OR A LIBERAL DEMOCRAT

8. not sure
9. refused

Q89. What is your religious preference? Is it Protestant, Catholic, Jewish, some other religion, or do you not have a religious preference?

{Only Watershed Residents}

1. Protestant
2. Catholic
3. Jewish
4. Some other religion ----> Skip to Q91
5. No religious preference ----> Skip to Q91

8. not sure
9. refused

Q90. Which of these statements comes closest to describing your feelings about the Bible?

{Only Watershed Residents}

1. The Bible is the actual word of God and is to be taken literally, word for word.
2. The Bible is the inspired word of God, but not everything in it should be taken word for word.
3. The Bible is an ancient book of fables, legends, history, and moral precepts recorded by men.

8. not sure
9. refused

Q91. If you have any additional comments or questions, I can note them now. That was my last question. Thank you VERY MUCH for volunteering your precious time to this study and to the University.

Q92. **[INTERVIEWER, ASK IF NECESSARY-- OTHERWISE ENTER THE CORRECT NUMBER]**

"For survey purposes, I need to ask you are you male or female?

1. male
2. female

APPENDIX C

PRESURVEY LETTERS

[LETTER SENT TO WATERSHED RESIDENTS]

Dear Neighbor,

Within the next few days, an interviewer from the **Social Sciences Research Institute** at the **University of Tennessee** will be calling your home. The purpose of the call will be to conduct a telephone interview with a member of your household about **water quality and land management issues** that affect your community and the Norris Lake Reservoir area.

I am notifying you now because many people prefer to be informed in advance that a study approved by the **University of Tennessee** is being conducted and that they will soon be contacted over the telephone.

Your household is one of a small number that are being asked to provide their views on issues affecting your community. It was chosen randomly from local telephone directories. In order for the results of the study to truly represent the thinking of people living in your community, it is <u>very</u> important that each interview is completed.

When the interviewer calls, he or she will ask to speak to a person who is 18 years of age or older, <u>and</u> who has had the <u>most recent birthday</u>. This is done to ensure that the person within your household is randomly selected.

The interview should take only a few minutes of your **precious** time. Naturally, all of the responses will be **confidential**, and participants can end the interview at any time. If you are called at an inconvenient time, please tell the interviewer and he or she will be happy to call you at a more convenient time.

Your household's contribution to this **University of Tennessee** approved study will be greatly appreciated, and the information you provide will help to develop educational programs and public policies designed to improve the quality of life in your community. If you have any questions, please feel free to call me at 974-6021.

Thank you for your support,

Dr. Robert Emmet Jones

[LETTER SENT TO TVA PARTICIPANTS]

Dear Neighbor,

Within the next few days, an interviewer from the Human Dimensions Lab at the **University of Tennessee** will be giving you a call at home. The purpose of the call will be to conduct a telephone interview about **water quality issues and public lands management in the Norris Lake area.**

I am notifying you now because many people prefer to be informed in advance that a study approved by the **University of Tennessee** is being conducted and that they will soon be contacted over the telephone.

You are one of a small number of individuals that are being asked to provide their views on issues affecting you and your community. In order for the results of the study to truly represent the thinking of people like you, it is very important that each interview is completed.

The interview should take only a few minutes of your **precious** time. Naturally, all of the responses will be **confidential**, and participants can end the interview at any time. If you are called at an inconvenient time, please tell the interviewer and he or she will be happy to call you at a more convenient time.

Your contribution to this **University of Tennessee** sponsored study will be greatly appreciated. The information you provide will help improve public input into natural resource management in the Norris Lake watershed. If you have any questions, please feel free to call me at 974-6021.

Thank you for your support,

Brent K. Marshall
Department of Sociology
University of Tennessee

VITA

Brent K. Marshall was born in Santa Rosa, California on October 11, 1965. He attended schools in the public system of Whatcom County, Washington, where he graduated from Blaine High School in June 1984. He entered the University of Washington during August of 1984, where in March 1989 he received the Bachelor of Arts in Political Science. After working for four years at Northwest Resource Associates, a nonprofit human services agency, he entered the Master's program in Political Science at the University of New Orleans in August of 1993, officially receiving the Master's degree in July 1995. He entered the Ph.D. program in Sociology at the University of Tennessee, Knoxville in August 1995. The doctoral degree was received May 2001. He is presently an Assistant Professor in the Sociology and Anthropology Department at the University of Central Florida.