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Alexander M. Stoner
University of Tennessee - Knoxville, astoner1@utk.edu

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To the Graduate Council:

I am submitting herewith a thesis written by Alexander M. Stoner entitled "Georgian's Reaction to Water Shortage: Water Conservation Behavior during the 2007 Drought." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Sociology.

R. Scott Frey, Major Professor

We have read this thesis and recommend its acceptance:

Stephanie Bohon, Robert Jones

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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GEORGIAN'S REACTION TO WATER SHORTAGE: WATER CONSERVATION BEHAVIOR DURING THE 2007 DROUGHT

A Thesis Presented for
the Master of Science
Degree
The University of Tennessee, Knoxville

Alexander M. Stoner
May 2010

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ABSTRACT

This thesis examines whether or not differences in people's water conservation attitudes, political party orientation, severity of drought, and attention to drought news affect their engagement in water conservation behavior during a time of continued water shortage. Previously, it has been found that attitudes are predictive of intentions that relate to behaviors (e.g., Dietz et al. 2005). Democrats have been shown to be more pro-environmental then Republicans (e.g., Dunlap et al. 2000). It has also been found that severity of drought is positively related with environmental concern (e.g., Accury and Christianson 1990), and access to news information is directly related to willingness to take action (e.g., Johnson and Scicchitano 2000).

However, during a time of drought, what is the relationship between individual water conservation attitudes and behaviors? Do conventional understandings of political party orientation and water conservation behaviors hold during a time of drought? Do those living in counties that experience more severe drought engage in more water conservation behaviors? Do those who pay more attention to drought news engage in more water conservation behaviors? Using data from Georgia's 2007 Peach State Poll, I explore the answers to these questions.

I examine how water conservation attitudes (Model 1), political party orientation (Model 2), drought severity (Model 3), attention to drought news (Model 4), sociodemographics, controls, and other factors from models 1-4 (Model 5) influenced water conservation behavior during the 2007 Georgia drought.

Results indicate that differences in people's water conservation attitudes, political party orientation, drought severity, and attention to drought news did not significantly affect their water conservation behavior during the 2007 drought. However, race, class, and gender variables in the full model did have a significant effect, which seems to suggest that one's location in the social stratification system affects their opportunities to engage in water conservation behavior. Therefore, environmental policy issues should not be considered apart from social issues.

The fundamental theoretical significance of the following research is that we affect and are in turn affected by the biophysical world in a dialectic fashion. Recognizing the quality, quantity, and interrelatedness of nature-society relationships is essential for future research.

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CHAPTER I

INTRODUCTION

My thesis explores the question of whether or not certain differences between people affect their conservation behavior during a time of environmental crisis. Specifically, I want to know if differences in people's water conservation attitudes, political party orientation, severity of drought, and attention to drought news affect their engagement in water conservation behavior during a time of continued water shortage. Previously, it has been found that attitudes are predictive of intentions that relate to behaviors (e.g., Dietz et al. 2005). Democrats have been shown to be more proenvironmental then Republicans (e.g., Dunlap et al. 2000). It has also been found that severity of drought is positively related with environmental concern (e.g., Accury and Christianson 1990), and access to news information is directly related to willingness to take action (e.g., Johnson and Scicchitano 2000).

However, during a time of drought, what is the relationship between individual water conservation attitudes and behaviors? Do the conventional understandings of political party orientation and water conservation behaviors hold during a time of drought? Do those living in counties that experience more severe drought engage in more water conservation behaviors? Do those who pay more attention to drought news engage in more water conservation behaviors?

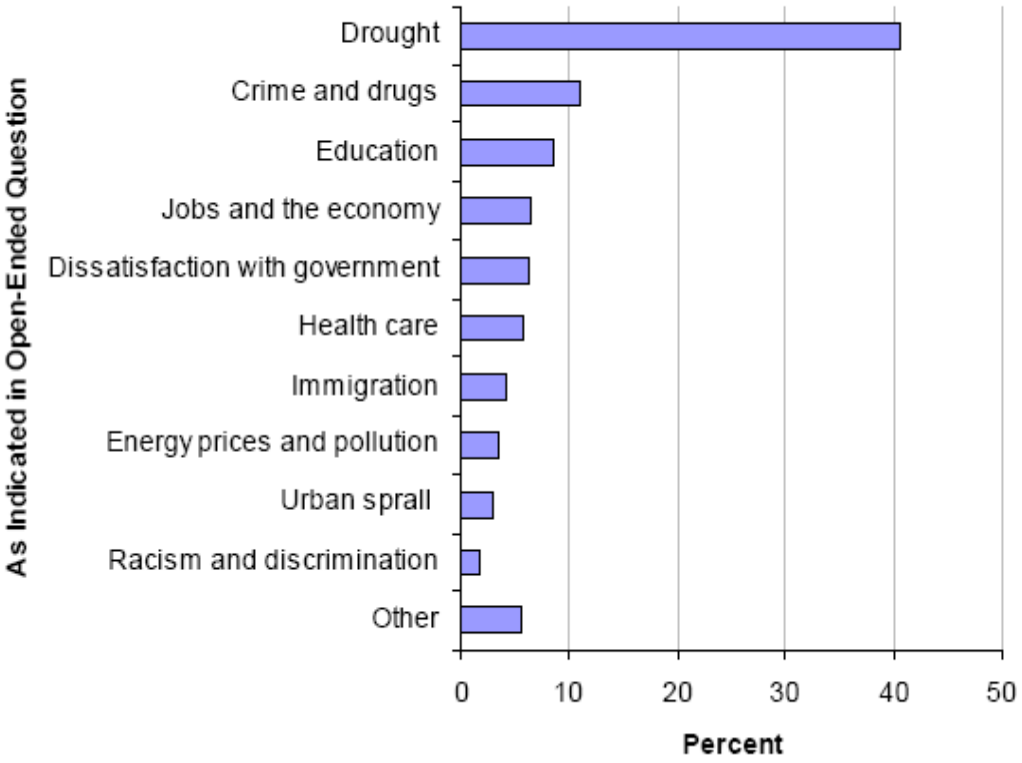
Using data from Georgia's 2007 Peach State Poll, I explore the answers to these questions. Georgia is a particularly appropriate case because in 2007, Northern Georgia suffered some of the most severe water shortages in more than a century (O'Driscoll and

Copeland 2007). The drought caused a rapid decline in hay production and farmers worried about decreased feed for their cattle (Haire 2007, Scott 2008). The water shortage lead peanut farmers to delay planting, which lead to decreased crop yield (Haire 2007, Scott 2008). The drought prompted concern among water and energy specialists, planners (Barczak and Carroll 2007) and politicians. Georgia Governor Sunny Purdue, for example, declared a state of emergency and made a public appearance at the state capital praying for rain.

Like other southern states, Georgians tend to be conservative and Republican. Bush easily took the state's electorate in both the 2000 and 2004 elections. Republicans have traditionally been opposed to government involvement which may explain their lower levels of environmental concern since it is in the political sphere where environmental policy and action take place. However, I am interested in whether or not partisan differences affect environmental behavior during a time of crisis.

I am also interested in seeing if different water conservation attitudes affect water conservation behavior during a time of resource scarcity. That is, during a time of drought what is the relationship between water conservation attitudes and behaviors? The drought in Georgia was an issue of concern among the general population. The 2007 Peach State Poll found that forty-one percent of the respondents cited drought as the most important problem facing the state, indicating the greatest public focus on a single issue in six years of polling (see Figure 1). Given the saliency, public concern, and adverse effects of the drought, one would expect Georgians to be engaged in more water conservation behavior than when water shortages were not a concern.

Figure 1. The Most Important Problem Facing Georgia Today



Because attitudes are predictive of intentions that relate to behaviors I examine the effect of respondents' water conservation attitudes on water conservation behavior. Previous research examining the relationship between environmental attitudes and behavior has yielded inconsistent results (Olli et al. 2001).

The severity of a specific environmental problem may cause individuals to curb their environmental behavior. One possible explanation is that legal restrictions may be in place in severe drought areas or access to the resource is simply unavailable in some places. In such a situation, the characteristics of the resource are significant. Fresh water, for example, is essential for human survival, but is becoming increasingly scarce. Do those living in counties that experienced more severe drought engage in more water conservation behaviors? Severity of drought has been found to be positively related with environmental concern (Accury and Christianson 1990). Perhaps the social visibility of water shortages is made more evident during times of drought, as indicated by Georgian's high level of concern.

Do those who pay more attention to drought news engage in more water conservation behaviors? Available access to information has been shown to be directly related to uncertainty, trust, and willingness to take action (Johnson and Scicchitano 2000). However, access to information about specific environmental problems may have been less important during Georgia's 2007 drought when the severity of continued water shortage was experienced immediately. In addition, many reinforcing drivers of social stratification, such as income and education influence one's ability to engage in action that may ameliorate the region's freshwater problem.

Overall, research is needed to see if certain differences between people affect their water conservation behavior during a time of drought. My thesis examines whether or not differences in people's water conservation attitudes, political party orientation, severity of drought, attention to drought news, and sociodemographics affect their water conservation behavior during Georgia's 2007 drought.

STATEMENT OF PROBLEM

To my knowledge, there has been little social science research on the 2007 drought in Georgia that has examined the factors influencing water conservation behavior (for an exception see Scott 2008). This gap in the literature is problematic given that water shortage is an issue that continues to affect the state and the southeastern United States more generally. The saliency of the drought issue reflects Georgian's concern about their water, but what factors are associated with water conservation behavior? The following research will examine how water conservation attitudes, political party orientation, drought severity, attention to drought news, and sociodemographics influence water conservation behavior during the 2007 Georgia drought. A better understanding of this situation may provide insight into support for state long-term environmental regulation and its interaction with institutional responses.

Following Dunlap and Jones (2002), the present study relies on policy-relevant survey data to concretize one complex environmental problem in a particular locale and during a specific time. Given that drought and water restrictions have been found to accelerate change in individual environmental worldviews (e.g. Arcury and Christianson 1990), this research highlights the relationship between critical environmental experience

and the factors that affect an individual's water conservation behavior, as this is the time when policy makers are most willing to act (Johnson and Scicchitano 2000).

STATEMENT OF PURPOSE

By emphasizing both the social and environmental context during Georgia's 2007 drought, this study outlines areas for future research and the possibility of better water management. Examining Georgian's reaction to the drought during a continued time of water shortage may persuade policy makers of the immediate importance to act on more sustainable water policies. The public saliency of the drought issue reflects Georgian's concern and awareness of the environmental problem to some extent. A better understanding of the factors that may affect an individual's water conservation behavior in a time of drought may contribute to more democratic water policies.

Data will be used from the autumn 2007 Peach State Poll conducted by the Carl Vinson Institute of Government at the University of Georgia between November 19 and December 2, 2007. The 2007 poll included 800 telephone interviews of randomly selected adults in Georgia and was conducted during a time of extreme drought (Svoboda 2007) and thus reflects respondents' water conservation behavior during a time when water utilization was especially problematic. Using binomial regression analysis, I examine how water conservation attitudes, political party orientation, drought severity, attention to drought news, sociodemographics, and other factors influenced water conservation during the 2007 Georgia drought. A full model that includes all covariates will also be analyzed. Analyzing the factors that may influence individual water conservation behavior allows me to contextualize previous environmental values and

attitudes literature by focusing on a concrete environmental problem in a specific time and place.

The history of water management in the Georgia area will also be examined by focusing on the interrelated processes of global warming, development, and water management. This will help provide the broad social context in which individuals engage in water conservation measures—an approach typically not employed in the environmental attitude or behavior literature. By examining Georgian's water conservation behavior during the 2007 drought this study seeks to build on and contextualize previous literature on environmental values and attitudes and highlight the relationship between attitudes, behaviors, drought severity, political party orientation, and attention to drought news during a time of extreme water shortage.

Table 1 lists the specific research questions each analytic model addresses. In Model 1, I examine the relationship between individual water conservation attitudes and water conservation behavior during a time of drought. I suspect that those more concerned with water conservation to be engaged in more water conservation behavior. Model 2 allows me to examine whether or not conventional understandings of political party orientation and water conservation behavior hold during a time of drought. I anticipate that political party orientation will not be a significant predictor of water conservation behavior due to the immediacy and public saliency of the 2007 drought. In Model 3, I examine whether or not those living in counties that experienced more severe drought engage in more water conservation behavior. I expect those who live in counties that experience more severe drought to be engaged in more water conservation behaviors.

Model 4 allows me to see whether or not those who pay more attention to drought news engage in more water conservation behavior. I anticipate those who pay more attention to drought news to be engaged in more water conservation behaviors. Finally, in Model 5, I examine the effect on Models 1-4 of incorporating sociodemographics and other controls into the analysis.

Table 1. Key Research Questions and Models.

During a time of drought, what is the relationship between individual water conservation attitudes and individual water conservation behaviors?	Model 1
Do the conventional understandings of political party orientation and water conservation behaviors hold during a time of drought?	Model 2
Do those living in counties that experience more severe drought engage in more water conservation behaviors?	Model 3
Do those who pay more attention to drought news engage in more water conservation behaviors?	Model 4
What is the effect on Models 1-4 of incorporating sociodemographics and other controls into the analyses?	Model 5

ORGANIZATION OF THESIS

Chapter two will provide a background for Georgia's 2007 drought and discuss the existing environmental values, attitudes, and behavior literature. In chapter three I will outline my data and methods. Chapter four will present the findings and implications. Finally, in chapter five I will discuss the overall theoretical and policy significance of the study, the shortcomings of the research, and areas for further research.

CHAPTER II

BACKGROUND

According to the United Nations, by 2025, 1.8 billion people will live in countries with absolute water scarcity (Schnoor 2007) while global demand is predicted to increase as much as ten times (Homer-Dixon 2001). Regardless of economic growth, wealthy nations such as the United States are being adversely affected by water shortages. This seems to have undermined the theoretical assumptions of ecological modernization theory, i.e. the notion that "the centripetal movement of ecological interests, ideas and considerations involved in social practices and institutional developments" will result in "the constant ecological restructuring of modern society" (Mol 2001: 59). In fact, US economic growth, development, and related issues such as suburban sprawl seem to have perpetuated extreme water shortage. With increased scientific research documenting human induced ecological degradation it is certainly becoming more widely known that our environment is in crisis. However, forms of collective living in the US do not appear to be conducive to reconciling our destruction of the planet. In fact, we are exacerbating the problem. Given the inadequate explanations of ecological modernization theories to explain ongoing environmental resource scarcity, research is needed to better understand the relationship between specific water shortages and a society's ability to solve these particular challenges.

At the theoretical level, environmental resource scarcity is continuously reinforced through broad and complex social-psychological contexts that affect the environmental actions pursued in any given society (Homer-Dixon 1999). In the U.S.,

where economic growth is society's primary goal, individual environmental consciousness may become distorted. This is because economic growth and development greatly reduce the "social visibility" of human-induced environmental impacts (Schnaiberg and Gould 2000) while depleting the availability of natural resources. Not surprisingly, an increase in a society's economic growth and development does not necessarily correlate with a greater ability to offset the adverse consequences of water shortages. One way of offsetting this process is by making sure all members of the population have adequate access to the societal resources that would allow them to engage in water conservation behavior. More so, adequate information about specific environmental problems could motivate the collective response needed to embark on more sustainable forms of social organization.

Historically, it seems that a society's environmental impact is only discovered after seemingly discrete actions and patterns of social organization accumulate to such a considerable amount that they reflect patterns that were previously unnoticed. This process is perhaps most obvious in the situation of environmental catastrophes and public attention to the environment[1]. Therefore, research examining specific environmental problems should recognize the structural factors that affect and constrain individual environmental action.

This chapter discusses the problem of water shortage by framing it in terms of a general global phenomenon, reinforced by global warming, development and water management. I then narrow my focus to concentrate on the specific 2007 drought in Georgia, US. These processes are indicative of the basic antithesis between advanced

[1] For example, the London smog disaster of 1952 generated social concern and prompted the subsequent Clean Air Act of 1956.

forms of social organization and the well-being of the biophysical world. I then discuss the existing environmental values, attitudes, and behavior literature. I conclude by arguing that the present study builds on existing research and fills important gaps in the environmental behavior literature by examining water conservation behavior during a time period in which there was considerable public attention to a water shortage.

SOCIAL PROCESSES OF WATER SHORTAGE: GLOBAL WARMING, DEVELOPMENT, AND WATER MANAGEMENT

Global Warming

Global warming causes severe and often unpredictable differences in the distribution of rainfall and frequency of floods and droughts (Schnoor 2007). Many people around the world are confronted with the negative consequences of global climate change. To the extent that human induced global warming is not slowing down there is reason to believe that global warming induced drought will be experienced more and more across the country.

Although global warming is not a new phenomenon, its effects on drought in the south-east United States are. Patrick Mulholland and eight other scientists (1996) from the south-east United States have identified eight ecological effects due to global climate change by studying fresh water in the region. They found that as temperatures rise and growing seasons lengthen, organic matter decomposition, nutrient cycling, and primary production increases. Mulholland and his colleagues also found that fresh water species in Appalachian streams decreased, along with water quality and organic matter storage.

Drying of wetland soils was found to have increased and the expansion of nuisance species northward has led to the creation of new problems for land and water management. Global climate change in the south-east United States was also found to lead to the eutrophicaton of Florida lakes and changes in the flushing rate of estuaries.

In the south-east United States, 2007 exceeded any drought on record for the region (Knox News Sentinel March 30, 2008). Since 2007 water shortages have affected other regions across the United States as well. In 2009, an article in *USA Today* compared these conditions to the 1930s "Dust Bowl" drought. Currently, global climate change is pushing the circulation rate limit of available freshwater worldwide (Oki and Kanae 2006).

Development

Development is another factor contributing to water shortages in the south-east United States and other areas around the world. For example, action was taken in Paulding County, Georgia, where legislatures stopped rezoning applications due to the strain new construction would put on disappearing water supplies (Manuel 2008). Suburban sprawl places excessive costs on developers, as new water and sewer hookups make up a majority of the capital costs in the new communities (Burchell 2005).

Overdevelopment in Georgia continues to be a contentious issue. In mid-August of 2008 unhindered development prompted Georgia to ask the Supreme Court to overturn a ruling that required approval from congress to use water from Lake Lanier for the already overdeveloped Atlanta area (http://www.ajc.com/metro/content/metro/stories/2008/08/14/court_water.html). This

highlights how policy favors more wealthy residents of the Atlanta area who also put a greater strain on the region's fresh water supply compared to the rest of the state.

The United States Geological Survey defines consumptive water use as the "difference between the amount of water withdrawn from and the amount returned to a river" (2007: 3034). In Georgia, consumptive use, mostly for irrigation, increases during the drier months of the summer, putting strain on dwindling water in a time of shortage. To speak of development is also to situate the current fresh-water shortage in relation to a form of social organization that now penetrates into virtually all aspects of everyday life.

Water Management

Water management is another factor that affects the ability a state has to respond to drought. As Reisner (1993) has noted, water management in the South has been characterized by the contradictory projects of damming and channeling rivers. This is because channeling a stream promotes floods, while dams are built to prevent flooding.

Water management is also thoroughly political, as exemplified by Georgia's request for more free access to Lake Lanier. Reisner (1993) has described the relationship between water management and politics as "pork barrel", with House and Senate committees and the water development agencies working to reward those who vote for water projects and punishing those who do not. Water projects are usually welcomed, as they are seen by most to generate employment opportunities and capital revenue.

In 2007, Northern Georgia suffered some of the most severe water shortages, prompting concern among water and energy specialists and planners (Barczak and

Carroll 2007). The drought was also an issue of concern among the general population. The 2007 Peach State Poll conducted by the Carl Vinson Institute of Government at the University of Georgia found that forty-one percent of the respondents cited drought as the most important problem facing the state, indicating the greatest public focus on a single issue in six years of polling (see figure 1.). Given the saliency, public concern, and adverse effects of the drought, one would expect Georgians to be more engaged in water conservation behavior compared to times when water shortages were not a major concern within the population. However, many complex and reinforcing factors contribute to what appears to be a persistent freshwater shortage in the region. A better understanding of this situation may provide insight into the factors that may influence individual water conservation behavior during a time of extreme water shortage. If, for example, certain members of society are systematically denied the opportunity to engage in water conservation behavior and live in areas disproportionately affected by environmental hazards, then social analysis should be aimed at emancipation from this social oppression. Such an approach should remain critical of various ideas that hide our involvement in social oppression (Dandaneau 2001).

ENVIRONMENTAL VALUES, ATTITUDES, AND BEHAVIOR LITERATURE

Environmental Values

The concept of values is often engaged when discussing humans' relationship to the biophysical world, with the assumption that values influence decisions (Dietz et al.

2005). Much of this literature concerning environmental values, issues, and problems has drawn on the social psychology of values. The issue of the relationship between environmental values and environmental behavior has been at the core of this literature. Forty years ago, Wicker (1969) noted a tenuous relationship between attitudes and behavior. This assumption has been subsequently undermined by empirical and theoretical work. However, it remains unclear precisely what forces influence environmental values and behavior in a specific time and place.

Analyses based upon Ajzen and Fishbein's (1980) theory of reasoned action (e.g. Routhe, Jones, and Feldman 2005; Gill, Crosby, and Taylor 1986) and Schwatz's norm-activation model of altruism (e.g. Schwartz 1968; Schwartz and Howard 1981; Stern and Dietz 1994) have been shown to be statistically valid. Shwartz and Bilsky (1987) define values as being "(a) concepts or beliefs, (b) about desirable end states or behaviors, (c) that transcend specific situations, (d) guide selection or evaluation of behavior and events, and (e) are ordered by relative importance" (551). Rokeach (1973) developed a system of measuring values which has since provided the basis for the majority of work on value measurement (Dietz et al. 2005).

The environmental values literature emphasizes individual values as being the key to the values of society. This view risks underestimating the effect of structures and institutions that constrain individual environmental behavior (Guagnano et al. 1995) and fails to adequately contextualize concrete environmental situations that may compel or constrain individual environmental behavior. Critics of the environmental value approach for understanding environmental issues and problems have indicated how a

majority of the work is de-contextualized in that it places less emphasis on structural factors and its lack of policy implications (e.g., Corraliza and Berenguer 2000; Foster 1995). Environmental value theories have engaged the idea of altruism to explain environmental behavior and question whether individuals act out of the self-interest associated with individualistic thinking. Studies suggest that altruistic intentions are associated with engagement in more environmental behavior (e.g., Heberlein 1972; Schwartz 1973, 1977). This work has also been empirically supported (e.g., Black 1978; Black et al. 1985; Guagnano et al. 1995; Schultz and Zelezny 1999; Widegren 1998). Others have looked at religion to show how different types of religious values may predispose individuals to varying levels of environmental behavior (e.g., Schultz, Zelezny, and Dalrymple 2000; White 1967; Dietz et al. 1998; Kempton, Boster, and Hartley 1995).

Dunlap and Jones (2002) note that the idea of environmental concern is comprised of the two essential notions of environment and concern. They argue that the use of a wide range of measures confuses what is meant by the terms environment and concern (Dunlap and Jones 2002). Biophysical problems have become increasingly complex, severe, and interrelated. That is, any attempt to empirically explain the phenomena is partial. However, there are three key elements suggested by previous literature in conceptualizing environmental issues: (1) organization along a general-specific environmental issue continuum; (2) the importance of geographic specificity; (3) the importance of temporal specificity (Dunlap and Jones 2002: 487). Although progress has been made in establishing the social bases of environmental concern correlates, less

progress has been made in identifying environmental behavior correlates (Olli et al. 2001). In the following study I attempt to move toward closing this gap by providing a more contextualized analysis through an examination of the affects of water conservation attitudes on water conservation behavior.

Environmental Attitudes

Environmental attitudes and values are difficult to measure because they cannot be observed directly and because the nature of conceptual and measurement validity is dynamic. In general, attitudes are seen to differ from values in that attitudes are "positive or negative evaluations of something quite specific" (Dietz et al. 2005: 346). Environmental attitudes are thought to be indicative of broader environmental values and are associated with sociodemographic variables. Dunlap et al. (2000) maintain that today we are in the midst of a fundamental reevaluation of the underlying worldview that has guided our relationship with the environment because of a growing awareness of global environmental problems. This is illustrated through current environmental policy, which symbolizes increasing acknowledgement of problematic relationships between industrialized societies and the environment (Dunlap et. al 2000).

For example, there is evidence that Dunlap et al.'s (2000 new environmental paradigm (NEP), a measure of pro-environmental beliefs, is gaining adherents (Dunlap et al. 2000). Dunlap et al. (2000) examined trends in Washington residents' support for the NEP over a fourteen year period (1976-1990). Overall, they found a slight increase in respondents' endorsement of the NEP. In particular, two items that focused on the likelihood of ecological catastrophe showed the largest respondent increase, suggesting

contemporary global ecological problems are having some effect on public concern. However, two items that focused on ecological limits showed a decline in support. Dunlap et al. (2000) suggest that this may be due to the impact of the Reagan era.

Only one study (Accury and Christianson 1990) has used longitudinal data on public endorsement of the NEP. Accury and Christianson (1990) examined Kentucky residents' endorsement of the NEP over a four year period (1984-1988) that followed an initial summer of extreme drought. They found an increase in pro-environmental responses only in counties that had experienced water use restrictions because of the drought. Accury and Christianson (1990) explain that critical environmental experience such as drought can accelerate change in environmental worldviews. However, overall there is modest support that an ecological worldview is gaining support (Dunlap et al. 2000).

If there is a growing concern about society's relationship to the environment it is not reflected in the dominant forms of social organization in the US. Take, for example, suburban sprawl in the Atlanta region. The Environmental Justice Resource Center note many environmental and social problems induced by sprawl development in Atlanta. Their 1999 report explains that,

> "The *environmental effects* of sprawl include automobile dependency, urban infrastructure decline, core city abandonment and disinvestment, increased energy consumption, air pollution, threat to farm land and wildlife habitat, and diminished quality of life. The *social effects* include urban core poverty, unemployment, limited mobility, economic disinvestment, social isolation, city/suburban school disparities, public health threats, and safety risks" (EJRC 1999).

Suburban sprawl is not unique to the Atlanta region and similar adverse side effects of the form of development can be found around the US. However, it should be

possible for people to live collectively in ways that are committed to more sustainable environmental behavior. What factors mediate individuals' inability to engage in environmental behavior?

The values-beliefs-norms theory of environmental concern and behavior (Stern 2000) emphasizes the indirect relationship between values and decisions about the environment. This theory suggests that values influence an individual's environmental worldview and are directly related to one's attitudes about the effects of specific environmental change (Dietz et al. 2005). These attitudes in turn affect our perceptions of our ability to react to a specific environmental situation such as drought (Dietz et al. 2005). Similarly, the attitudes-behavior-constraints theory (Guagnano, Stern, and Dietz 1995) focuses on the interaction between attitudes and the various constraints that shape environmental behavior.

Tarrant and Cordell (1997) argue that a weak attitude-behavior correspondence may be due to "neglect of external 'nonattitudinal' factors, including normative behaviors, sociodemographic variables, personality characteristics (such as locus of control, knowledge, and political affiliation) and situational conditions (such as providing opportunities to perform the behavior)" (Tarrant and Cordell 1997: 622). More so, previous research has examined sociodemographic as separate effects on either environmental attitudes or behavior (Tarrant and Cordell 1999), failing to show the relationship between sociodemographic factors and attitudes on behavior.

Environmental Behavior

Although weak attitude-behavior relationships has been shown to be a result of a lack of attitude-behavior correspondence in the indicators chosen and/or a lack of general attitude-behavior knowledge, (e.g. Ajzen and Fishbein 1980), studies have continued to yield varying results, (e.g. Newhouse 1990; Shultz and Oskamp 1996). Olli et al. (2001) suggest that one possible explanation for the inconclusive attitude-behavior relationship is the neglect of social context and the omission of external factors. Still, individual pro-environmental attitudes do not always correlate with an increase in environmentally conscious behavior (Accury and Chritianson 1990).

Engel and Potschke (1998) have shown that women are more likely to behave environmentally conscious than men. However, in their review of the previous environmental behavior literate, Olli et al. (2001) note that "there is a weak tendency for women to be more environmentally concerned but environmentally less active than men" (2001: 184). But as Olli et al. (2001) note, the finding that men are engaging in more environmental behavior may be because men tend to be more active in the public sphere. That is, results of environmental behavior and gender correlations should acknowledge whether that behavior is public, personal, or private (Olli et al. 2001). Jones and Dunlap (1992) note that overall there is not a significant difference between gender and environmental concern, but when differences are found, women seem to be more environmentally concerned than men.

Similarly, the relationship of environmental behavior and age has not been consistently established (Dietz et al. 1998, Olli et al. 2001). One reason is because older

people who grew up during the depression and adapted fragile behaviors influence their children through prudent socialization (Olli et al. 2001: 184). In both cases, conservation may be unrelated to environmental values and attitudes. More so, the increasing awareness of the complexity of environmental problems may raise current age cohort's environmental concern, but not their behavior because they are "taught to behave in an environmentally friendly way within an affluent society" (Martensson and Petterson 1997).

In general, those with higher levels of income and education are engaged in more environmental behaviors. Greater scientific knowledge is thought to be associated with greater concern about environmental risks (Davidson and Freudenburg 1996), which leads to environmentally conscious behavior. Higher income is associated with environmental behavior, as those who earn more "spend proportionately less on material necessities such as food and shelter" (Ollie et al. 2001: 186). However, this does not explain why poor nations consume less and have less impact on the environment.

The complexity of environmental problems, from the general to specific, clearly highlights the need for more contextualized analyses that examine correlates of environmental behavior that deal with particular environmental issues. By examining the 2007 drought in Georgia, U.S., the following research moves toward overcoming some of the shortcomings of previous work because my analysis is time specific and focuses on a particular environmental situation. Environmental policy action usually follows "the period of peak public concern with an issue or in the period immediately after that peak in public conern" (Peters and Hogwood 1985: 238). Therefore, it is important to analyze

whether conventional understandings and previous findings of individual environmental behavior hold in a time of environmental issue severity and salience.

SUMMARY

This chapter provided the broad and particular social and environmental background of the 2007 drought in Georgia. Global warming, development, and water management were shown to reinforce general and specific water shortages. The latter half of the chapter focused on the previous environmental values, attitudes, and behavior literature. Much of this work has been guided by a social psychology approach, which assumes individual environmental values and behavior are fundamentally the values of society. It was shown that correlates of environmentally significant behavior have not been reported consistently and that environmental attitudes may operate independent of environmental behavior.

CHAPTER III

DATA AND METHODS

In this chapter I will discuss the source of data. I then identify the variables in the study and justify their use while noting the expected outcomes. Next, I discuss my method of analysis and outline four bivariate models (Models 1-4) and one multivariate model (Model 5) by focusing on the specific research questions each model allows me to address.

DATA SOURCE

The research was based on data from the 2007 Peach State Poll conducted by the Carl Vinson Institute of Government at the University of Georgia between November 19 and December 2, 2007 (2007 Peach State Poll; http://www.cviog.uga.edu/peachpoll/2007-12-17.pef). The Vinson Institute introduced this poll in September 2001 as a way to provide additional information to both the Georgian public and policymakers as they make decisions about the state's policies. The 2007 poll included 800 telephone interviews of randomly selected adults in Georgia (the margin of error at the 95 percent confidence level was +/- 3.5% for the full sample).

DEPENDENT VARIABLE: WATER CONSERVATION BEHAVIOR

The water conservation behavior variable was measured in the survey by the respondents' reported engagement in a variety of water saving measures. Specifically, the respondents were asked how many of seven behaviors they were engaged in: (1)

taking shorter showers, (2) using faucets less, (3) watering lawn and garden less, (4) washing only full loads of laundry and dishes, (5) washing car less frequently, (6) checking for leaks, and (7) flushing toilets less often. The water conservation behavior variable is measured at the individual level and is discrete or *count data.* The scale ranges from 0 to 7 and measures the number of behaviors that respondents report that they engage in (see Table 2). As a whole, these seven items have a reasonably high level of inter-item correlation (ά = .753).

INDEPENDENT VARIABLES

The independent variables in this study are drawn from previous research and were chosen for two reasons. One, for some of the environmental behavior correlates discussed, such as environmental attitudes, results have been shown to be inconclusive. Two, little work has been done to see if established correlates of environmental concern are important during a time of critical environmental experience.

Table 2. Respondent Water Conservation Behavior

Number of Behaviors Engaged	Frequency	Percent
0	131	16.40
1	47	5.88
2	44	5.51
3	73	9.14
4	87	10.89
5	116	14.52
6	149	18.65
7	152	19.02

Notes: mean=4.10, standard deviation=2.50, N=799

Water Conservation Attitudes

What is the relationship between water conservation attitudes and behaviors during a time of drought? Because attitudes are predictive of intentions that relate to behaviors I examine the effect of respondents' water conservation attitudes on water conservation behavior. Previous research examining the relationship between environmental attitudes and behavior has yielded inconsistent results (Olli et al. 2001). Scott and Willits (1994) conducted a statewide survey of Pennsylvanians and found that although respondents expressed support for the NEP (New Environmental Paradigm) they were not likely to engage in environmental behavior. Also, because of the perceived urgency during a time of environmental crisis, environmental behavior may lag behind environmental attitudes.

The water conservation attitudes measure is a standardized scale used to measure respondents' level of concern about water conservation and has an alpha of 0.69. I conducted a confirmatory factor analysis to ensure that the survey questions used to construct the water conservation attitudes scale all tap into the same underlying construct. Promax rotation was then used to rotate the factor loadings. The results of my analysis revealed that four variables loaded on the water conservation attitude factor: (1) whether (coded 1) or not (coded 0) water conservation was very important; (2) how important (very, somewhat, or not at all) it is for Georgians to conserve water; (3) whether (coded 1) or not (coded 0) respondents were very concerned Georgia would not have enough water in ten years; and (4) whether respondents were very concerned or somewhat concerned about the quality of Georgia's water. Factor loading scores ranged from 0.53

to 0.85. This cluster of variables was used to create the water conservation attitude index.

Confirmatory factor analysis ensures that the loadings of indicator variables all measure water conservation attitudes; this is an important step, since it is customary to have five or more variables included in an exploratory factor analysis. This means the four variables that make up my water conservation attitudes measure have been structured in terms of the expected significant factor loadings and thus ensures that the intercorrelations among these variables are due to common factors association with water conservation attitudes. When all items tap the same underlying concept, a standardized scale is more reliable then considering each question individually. Higher values on the water conservation attitudes scale indicate a respondent's greater concern with water conservation.

It seems plausible to hypothesize that those more concerned with the environment will be more engaged in water conservation behaviors. However, given the public saliency of the 2007 drought issue, respondents' water conservation behavior may operate independently of water conservation attitudes. That is, differences in water conservation attitudes may not have a significant effect on water conservation behavior during a time of drought. In addition, external factors such as sociodemographics have all been shown to be directly related to environmental behavior (e.g., Jones et al. 1994, Morello et al. 2002, Brown 1995).

Political Party Orientation

Does the relationship between conventional understandings of political party orientation and environmental behaviors hold during a time of drought? Brechin and Freeman (2004) argue that the public's relationship to the environment is influenced by politics. Democrats have been shown to have greater environmental concern (e.g., Dunlap et al. 2000). Republicans have traditionally been opposed to government involvement, which may explain their lower levels of environmental concern since it is in the political sphere where environmental policy and action take place. Neumayer (2004) found left-wing parties and individuals to be engaged in more pro-environmental behavior. However, environmental behavior may take place independent of political party orientation and environmental concern.

Political party orientation is measured by two dummy variables (Republican and Democrat). Independent serves as the reference category. Although one hundred and eleven cases were missing (14%), I did not impute because this was a primary variable of concern. More so, the Markov Chain Monte Carlo algorithms which are typically used for multiple imputation are not well suited for imputing categorical variables and other procedures (like mean substitution) can produce biased estimates (Horton et al. 2003; Allison 2001, 2005; Schafer 1997). However, because of the high proportion of missing data, the results related to this variable that I will examine in later chapters should be interpreted with some caution. Examining political party orientation allows one to examine whether partisanship affects water conservation behavior during extreme water shortages. I am interested to see whether or not the severity and public concern with

water shortage during the Georgia drought will offset any significant affect of political party orientation on water conservation attitudes. One possible explanation is that during times of environmental crisis, material resource needs transcend political affiliation.

Drought Severity

The severity of a specific environmental problem may cause individuals to curb their environmental behavior. Possible explanations are that legal restrictions may be in place in severe drought areas or access to the resource is simply unavailable in some places. In such a situation, the characteristics of the resource are significant. Fresh water, for example, is essential for human survival, but is becoming increasingly scarce.

Do those living in counties that experienced more severe drought engage in more water conservation behaviors? Severity of drought has been found to be positively related with environmental concern (Accury and Christianson 1990). Perhaps the social visibility of water shortages is made more evident during times of drought, as indicated by Georgian's high level of concern. Since I am examining responses to the direct use value of water, one would expect those living in areas hardest hit by the drought would be experiencing the drought more immediately than their moderate to no-drought counterparts and thus be more likely to engage in water conservation measures. Again, the immediate need of water should curb individual water conservation behavior more as water shortages increase in intensity. Given that the northern part of Georgia was most severely affected by the 2007 drought, I expect those living in counties in this area to be engaged in more water conservation behaviors.

Using FIPS county codes and data from the US Drought Monitor, I created four categories of drought residence (see Appendix B). Drought severity is measured by four dummy variables (exceptional drought conditions, extreme or severe drought conditions, moderate drought or abnormally dry conditions, and not experiencing drought conditions). Living in a county not experiencing drought conditions served as the reference category.

Attention to Drought News

Do those who pay more attention to drought news engage in more water conservation behaviors? Available access to information has been shown to be directly related to uncertainty, trust, and willingness to take action (Johnson and Scicchitano 2000). I expect those who pay more attention to drought news will be engaged in more water conservation behavior. Misinformation and inadequate information about specific environmental problems leads to public uncertainty and distrust, which decreases individual action and increases the risk for policy makers to take action (Johnson and Scicchitano 2000). The media also affect the quality of information being transmitted. Dispensa and Brulle's (2003) study of newspaper coverage of global warming from several countries found that US coverage framed global warming as more controversial and theoretical. Decreased public awareness of the severity of specific environmental problems may be a result of greater corporate control over the media (Dispensa and Brulle 2003; Chomsky and Herman 1988; Herman 2000).

Attention to news about the drought is measured by three dummy variables (very little attention to drought news, some attention to drought news, and a great deal of

attention to drought news. No attention to drought news served as the reference category. Willingness to take action begins with knowledge of the problem at hand (Johnson and Scicchitano 2000), as the media's ability to present environmental problems as uncertain may decrease environmental behavior (Johnson Scicchitano 2000). Therefore, I expect that those who pay more attention to drought news will be engaged in more water conservation behaviors.

Control Variables

The controls for my model include place of residence, home ownership, gender, race, education, income, and age. All of these variables have been found to be correlated with environmental worldview. Age, along with education, political ideology, and place of residence have been shown to be the best predictors of environmental concern (Chawla and Cushing 2007; Schan and Holzer 1990). However, the impact of these seven variables on environmental behavior is not entirely clear. Therefore, it is important to look at their impact on environmental behavior.

Environmental worldview has been shown to be directly related to place of residence (Scott 2008; Accury and Christianson 1990; Dunlap et al. 2000). In addition, place of residence may be related to the social visibility of drought (e.g., Accury and Christianson 1990). That is, those living in rural areas may experience the effects of drought more immediately and may therefore be more likely to engage in water conservation measures. Place of residence was measured by two dummy variables (rural and urban). Suburban served as the reference category.

Home ownership is a dichotomous variable indicating whether the respondent owned (coded 1) or did not (coded 0) own a home. It is important to control for home ownership because those living in homes presumably use more water; and not all apartment water bills are paid individually.

Environmental worldview has been shown to be directly related to gender (Dupont 2004). It has also been shown that women are more likely to engage in proenvironmental behavior (Engel and Potschke 1998). Others have suggested that "women may be more environmentally concerned but less environmentally active than men" (Ollie et al. 2001: 184). Given the severity and public concern of the drought, I hypothesize that individual water conservation behavior may transcend gender effects found in the environmental behavior literature. That is, the immediate need for water conservation during drought may transcend gender roles. However, results should be interpreted with caution since women do more housework than men, thus, having more opportunities to engage in some of the water conservation behaviors listed such as changing how dishes and clothes are washed. Gender is dichotomous variable indicating respondents' self-identification as female (coded 1) or male (coded 0).

In general, whites have been found to be more concerned with the environment than non-whites (e.g., Barr 2003; Gilg et al. 2006). Previous research also indicates that non-whites are less likely to engage in environmental behavior (Taylor 1989; Jones et al. 1994). This is assumed to be because non-whites (especially African Americans) do not have the ability to financially engage in environmental behavior (Stern 2000; Commoner 1971) and may feel marginalized from society (Evans and English 2002; Kreger 1973).

However, as Jones and Rainey (2006) explain that these studies were based on a theoretical assumption that presumed non-whites were less concerned about the environment than whites (Jones and Rainey 2006: 478). This idea, referred to as the "Whites-only" hypothesis (Jones and Rainey 2006) reflects popular stereotypes about concern for the environment being relegated to whites only. In addition, blacks are more likely to feel that the government is not doing enough to protect the environment, which increases perceived risk and concern (Jones and Rainey 2006).

Controlling for race is important because it may explain whether racial differences exist or if there is state-wide engagement in water conservation behavior in a time of drought. Since in general blacks earn less than whites they may not have the opportunity to engage in some of the water conservation behaviors that I examine in this study. Specifically, questions about washing one's car less or watering one's lawn less may not apply given that blacks are more likely to live in apartments or residential housing and not own a car. Race is a dichotomous variable indicating respondents' self-identification as white (coded 1) or non-white (coded 0).

Education is one of the best predictors of environmental concern (Schahn and Holzer 1990). Engel and Potschke (1998) note a positive association between education and environmental behavior. The educational attainment variable is measured by four dummy variables (high school diploma or less; some college, but no 4-year degree; 4-year college degree; and post graduate work). Respondents who reported having a high school diploma or less served as the reference category. It is important to control for education because, in general, it has been shown to be positively related to environmental

concern and behavior. I expect to find a positive association between education and individual water conservation behavior.

Environmental worldview has been found to be directly associated with income (Accury and Christianson 1990; Dunlap et al. 2000). The theoretical rational for this relationship is based on Maslow's (1970) hierarchy of needs, which posits that basic needs must be met before higher order or luxury needs. Since environmental concern is often thought of as a luxury, those who earn less are unable to consider this luxury (Van Liere and Dunlap 1980). The household income variable is measured by five dummy variables indicating respondents' annual earnings ($20,000 to less than $30,000; $30,000 to less than $50,000; $50,000 to less than $75,000; $75,000 to less than $100,000; and $100,000 or more). Respondents who reported having earned an annual income of less than $20,000 served as the reference category.

Environmental worldview has been shown to be inversely related with age (Accury and Christianson 1990; Dunlap et al. 2000). Because it is not implausible to think that environmental worldview should be related to environmental behavior, I expect age to be inversely related to engagement in water conservation measures. However, the severity and public saliency of the drought may offset these conventional understandings. Age is a six-category scale. It was coded into ordinal categories (1=18-25 years, 2=26-35 years, 3=36-45 years, 4=46-55 years, 5=56-65 years, and 6=66 and older) and was treated continuously.

Summary statistics for my independent and control variables are presented in Table 3.

Table 3. Summary Statistics

Variable	Mean	SD	Minimum	Maximum	Obs
Attitudes	-0.00	0.64	-2.62	0.51	799
Political Party					
Republicans	0.36	0.48	0	1	689
Democrats	0.33	0.47	0	1	689
Independent (ref)	0.30	0.46	0	1	689
Drought Conditions					
Extreme/Severe	0.20	0.38	0	1	800
Exceptional	0.72	0.45	0	1	800
Moderate	0.12	0.31	0	1	800
No drought (ref)	0.02	0.13	0	1	800
News Attention					
Very little	0.26	0.16	0	1	795
Some	0.16	0.37	0	1	795
Great deal	0.80	0.40	0	1	795
None (ref)	0.01	0.11	0	1	795
Place of residence					
Urban	0.17	0.37	0	1	800
Rural	0.30	0.46	0	1	800
Suburban (ref)	0.53	0.50	0	1	800
Home Owner	0.86	0.34	0	1	791
Gender Male	0.52	0.50	0	1	800
Race White	0.78	0.42	0	1	772
Education					
High school or less (ref)	0.27	0.44	0	1	788
Some college	0.25	0.44	0	1	788
College degree	0.27	0.44	0	1	788
Post-grad	0.21	0.41	0	1	788
Income					
Less than $20,000 (ref)	0.10	0.31	0	1	653
$20,000 to less than $30,000	0.10	0.24	0	1	653
$30,00 to less than $50,000	0.17	0.37	0	1	653
$50,00 to less than $ 75,000	0.22	0.41	0	1	653
$75,000 to less than 100,000	0.17	0.38	0	1	653
$100,000 and over	0.28	0.45	0	1	653
Age	4.24	1.31	1	6	771

This table includes the mean, standard deviation, minimum and maximum numerical values, and number of observations for each independent and control variable. Unfortunately, social science surveys are usually affected by item non-responses and the 2007 Peach State Poll is no exception. The political party orientation and income variables presented in Table 3 are worth noting. Although there is a high degree of missingness for my political party orientation variable, I did not impute this variable because it is a key variable of concern. Likewise, the income variable has a considerable number of missing cases, but imputation was not used due to the importance of this control.

METHOD OF ANALYSIS

Negative binomial regression analysis was used to compute the regression coefficients and standard errors resulting from regressing a respondents' engagement in water conservation behavior on each predictor variable. Negative binomial regression fits a negative binomial maximum-likelihood regression model of the dependent variable on independent variables, where the dependent variable is a non-negative count variable (STATA version 9.0). Negative binomial regression is appropriate for the present analysis because the dependent variable that measures water conservation behavior is *count data*, measuring the number of behaviors that respondents reported that they engage in, and because the dependent variable is overdispersed (i.e., the sample variance exceeds the sample mean), therefore eliminating the possibility of using Poisson regression.

Several statisticians have promoted the use of negative binomial regression under certain data conditions (Byers et al. 2003). White et al. (1997) have advocated the use of negative binomial regression for analyzing frequency count data when models do not exhibit a Poisson distribution (which is the case with my behavioral models, indicated by tests not shown). Negative binomial regression can be interpreted as similar to ordinary least squares (OLS) regression (UCLA Statistical Consulting Group), but unlike OLS, un-standardized binomial regression coefficients do not indicate precise unit changes. In the present study, larger coefficients indicate a respondent's engagement in a greater number of water conservation behaviors.

Table 1, which lists my key research questions and models is reintroduced below. Four bivariate models were analyzed, which allowed me to examine the association between each predictor variable and water conservation behavior. I also examined a fifth full model that included all covariates. The reduced models examine individual water conservation behavior and the relationship associated with the variables of interest (water conservation attitudes, political party orientation, drought severity, and attention to drought news).

SUMMARY

This chapter presented the source of my data and explained the variables in the study. I noted the expected relationship between each predictor variable and water conservation behaviors and discussed previous findings. The specific research question each of my four bivariate models allows me to address was outlined along with the

anticipated outcomes of each model (Models 1-4). The full model (Model 5) will include estimates of all variables.

Table 1. Key Research Questions and Models.

During a time of drought, what is the relationship between individual water conservation attitudes and individual water conservation behaviors?	Model 1
Do the conventional understandings of political party orientation and water conservation behaviors hold during a time of drought?	Model 2
Do those living in counties that experience more severe drought engage in more water conservation behaviors?	Model 3
Do those who pay more attention to drought news engage in more water conservation behaviors?	Model 4
What is the effect on Models 1-4 of incorporating sociodemographics and other controls into the analyses?	Model 5

CHAPTER IV

RESULTS

This chapter outlines the findings of my analyses and provides a discussion of the results. I first present the findings of my four bivariate models. These models were analyzed to measure the effect of water conservation attitudes, political party identification, drought severity, and attention to drought news each separately on water conservation behavior. A full model was estimated that included all covariates. I then discuss results and conclude by outlining several limitations of the study.

MODEL ESTIMATES

Bivariate Models

Table 4 contains the negative binomial regression estimates of predictor variables on water conservation behavior for the five models. In Model 1, the effect of water conservation attitudes is positive (coefficient=0.16), suggesting that respondents with greater water conservation attitudes were more likely to engage in water conservation behavior. This is consistent with findings of Dietz et al. (2005) who claim that attitudes affect individual perceptions of one's ability to react to specific environmental situations. That is, individuals who are concerned with water conservation may be more likely to engage in actual water conservation behavior.

Estimates of Model 2 indicate that political party orientation is not a significant predictor of water conservation behavior (coefficient=0.02, Republicans; coefficient= -0.16, Democrats).

Table 4. Negative Binomial Effects of Predictor and Control Variables on Behavior

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Attitudes	0.16* (0.07)				0.06 (0.07)
Political Party					
Republican		0.02 (0.09)			-0.10 (0.10)
Democrat		-0.16 (0.11)			-0.06 (0.11)
Drought Conditions					
Extreme/Severe			0.40† (0.26)		0.07 (0.19)
Exceptional			0.46* (0.28)		0.07 (0.20)
Moderate			0.16 (0.30)		-0.27 (0.30)
News Attention					
Very little				-0.32 (0.45)	-0.32 (0.50)
Some				0.22 (0.24)	-0.15 (0.22)
Great deal				0.29 (0.29)	-0.13 (0.23)
Place of Residence					
Urban					0.24† (0.14)
Rural					0.16† (0.11)
Home Owner					0.06 (0.15)
Gender					
Male					0.19* (0.09)
Race					
White					0.24* (0.12)
Education					
Some College					-0.04 (0.13)
College Degree					-0.05 (0.13)
Post-grad					0.01 (0.14)
Income					
$20,000 to less than $30,000					0.34 (0.23)
$30,000 to less than $50,000					0.57* (0.23)
$50,000 to less than $75,000					0.32 (0.23)
$75,000 to less than $100,000					0.22 (0.26)
$100,000 and over					0.58* (0.26)
Age					0.13*** (0.03)

Notes: N=557 †p<.10; *p<.05; **p<.01; ***p<.001
Un-standardized regression coefficients shown (standard errors in parentheses).

However, as mentioned in Chapter II, Democrats have been shown to have greater environmental concern (e.g., Dunlap et al. 2000). Perhaps one's self identification as Republican, Democrat, or Independent is simply irrelevant in comparison with the public saliency and severity of the 2007 drought in Georgia. Individual political party identification is also more reflective of one's social environment. This is consistent with Brechin and Freeman's (2004) notion that environmental behavior may take place independent of political party orientation. Individual political party identifications are embedded in larger social structures such as social class. It is likely that these larger structures confound any significant association between political party identification and water conservation behavior.

Estimates of Model 3 indicate that those living in counties that experienced extreme/severe drought conditions were more likely to engage in water conservation behavior (coefficient=0.40) and those living in counties that experienced exceptional drought conditions were significantly more likely to engage in water conservation behavior (coefficient=0.46). However, moderate drought conditions were not a significant predictor of water conservation behavior (coefficient=0.16). These results reveal the influence one's immediate experience with the environment has on environmental behavior. That is, the immediate adversities of drought may have prompted those living in counties that experienced more severe drought conditions to engage in more water conservation behavior. This is consistent with previous work indicating a direct correlation between drought severity and environmental worldview (e.g., Accury and Chistenson 1990).

Results of Model 4 indicate that attention to drought news was not a significant predictor of water conservation behavior (coefficient=-0.32 very little; coefficient=0.22, some; coefficient=0.29, great deal). One possible explanation is that Georgian's immediate experience to the adverse effects of the drought overrode any affect attention to drought news would have on their water conservation behavior. Alternatively, media coverage may not have been powerful enough to curb individual behavior. To be sure, available access to information has been shown to be directly related to uncertainty, trust, and willingness to take action (Johnson and Scicchitano 2000). In addition, transparent and accurate media coverage of specific environmental situations is important because access to reliable information may serve to curb individual environmental behavior. This highlights the need for accurate and reliable media coverage to all members of the population. Inadequate information about specific environmental problems leads to public uncertainty and distrust, which decreases individual action and increases the risk for policy makers to take action (Johnson and Scicchitano 2000).

Full Model

Model 5 contains estimates of the effect of each predictor variable and control variable on water conservation behavior. Surprisingly, none of the predictor variables had a significant effect on water conservation behavior when all variables were included in estimates. These results do indicate that one's location in the social stratification system significantly affected water conservation behavior during Georgia's 2007 drought.

In the full model, water conservation attitudes (coefficient=0.06) did not have a significant effect on water conservation behavior. Drought severity (coefficient=0.07,

extreme/severe; coefficient=0.07, exceptional; and coefficient=0.-0.26, moderate), and attention to drought news (coefficient=0.10) were not significant predictors of individual water conservation behavior when all variables were included in estimates. The effect of political party orientation remained insignificant in the full model (coefficient=-0.10, Republican; coefficient=-0.06, Democrat).

Although the relationship was only slightly significant, those living in rural and urban areas were slightly more likely to engage in water conservation behavior compared to their suburban counterparts (coefficient=0.24, urban; coefficient=0.16, rural). This is consistent with previous work that has found a direct relationship between environmental worldview and place of residence (e.g., Accury and Christianson 1990; Dunlap et al. 2000). Home ownership did not have a significant effect on water conservation behavior in the full model (coefficient=0.06).

The finding that females are more likely to engage in water conservation behavior than men (coefficient=0.19) should be interpreted with caution. The majority of individual water conservation behaviors measured such as washing dishes less are more associated with domestic work, which, in a patriarchical society like the US, is often relegated to females. That is, this finding may reflect the gender inequality in current forms of social organization, as men tend to be more active in the public sphere.

Estimates indicate that whites (coefficient=0.24) were engaged in more water conservation behavior than non-whites, which is consistent with previous research indicating that racial minorities are less likely to engage in environmental behavior (e.g., Taylor 1989, Jones et al. 1994). Here, the significance of class is important to consider

because in general, non-whites have less education, earn less, and are exposed to more environmental degradation than whites. In other words, racial minorities at the bottom of the social pyramid are likely to be more exposed to the adversities associated with water shortages while their ability to engage in water conservation behaviors is reduced.

In the full model, educational level did not have a significant effect on water conservation behavior. Here, too, the constraints of the social stratification system places on minority group members is important to consider since non-whites and those earning less annually have in general, less education than more affluent whites. This is because the social hierarchies of race, class, and gender are interconnected.

Those earning $100,000 and over (coefficient=0.58), and those earning $30,000 to less than $50,000 (coefficient 0.57) were more likely to engage in water conservation behavior. This estimate reveals the significant effect of class, as those earning $100,000 or more a year (the highest reported income bracket) were found to be the most likely to be engaged in water conservation behavior (coefficient=0.58).

Finally, the results suggest that as age increases, so does water conservation behavior (coefficient=0.13). In the full model, age was the most significant predictor of water conservation behavior ($p<.001$). This may be because older people, who grew up during the depression, have adapted more frugal behaviors (Olli et al. 2001).

The results indicate that the full model (Model 5) is significant ($p<.001$), as reflected by the significance of the Wald χ^2. Results reveal that race, class, and gender played an important role in Georgian's engagement in water conservation behavior during the 2007 drought. Race, class, and gender are structural in nature, and as such,

they constrain the range of actions available to an individual. This finding reveals that an individual's ability to engage in water conservation behavior is contingent upon institutional stratification. That is, differential access to societal resources and unearned placement into differential constructs of race and gender greatly constrain and immobilize some, while privileging others. These findings show how one's location within hierarchies of race, class, and gender significantly affect the ability of an individual to engage in water conservation behavior. Therefore, discussions of water conservation must take these structural constructs into account.

DISCUSSION OF RESULTS

Do differences between people affect their conservation behavior during a time of environmental crisis? Results of Model 5 indicate that differences in people's water conservation attitudes, political party orientation, severity of drought, and attention to drought news did not affect their engagement in water conservation behavior during Georgia's 2007 drought. In the full model only race, gender, income, and age were significant predictors of water conservation behavior. In fact, those earning $100,000 or more a year (the highest reported income bracket) were found to be the most likely to be engaged in water conservation behavior (coefficient=0.58). These results seem to indicate that one's location in the stratification system significantly affects conservation behavior. However, blacks are less likely to own homes and therefore may not have the opportunity to engage in household water conservation behavior. In addition, blacks are more likely to feel that the government is not doing enough to protect the environment,

which increases perceived risk and concern (Jones and Rainey 2006) and may lead to less engagement in environmental behavior.

Previous research has indicated that females, blacks, and the poor are among the groups most likely to be adversely affected by drought. For example, Gerlak and Clarke (1998) found a significant correlation between black composition of counties and indicators of poor watershed quality. Racial minorities and the poor have been shown to be disproportionately affected by environmental risk (e.g., Cutter 1995; Morello et al. 2002). Bullard (1990) and Brown (1995) have both argued that the poor have less input in public decision making on the environment due to their marginalized status.

Therefore, it is important to stress the relationship between structural barriers and an individual's ability to engage in any given action. In the US, values of unlimited consumption serve to mask the skewed accumulation by some while simultaneously hiding how systems of stratification keep certain groups of individuals immobilized. If access to a certain level of annual income, for example, significantly affects water conservation behavior, then policy efforts will need to address how disadvantaged groups, which make up a majority of the population in Georgia, are systematically denied the opportunity to engage in environmentally sustainable behavior. According to Oxfam's (1999) social vulnerability index, the middle and south-western parts of Georgia are the most vulnerable to environmental crisis. This is also the parts of the state that are predominantly African American (US Census Bureau 2007). As Stern (2000) notes, "the efficacy of environmental citizenship depends on an individual's social and economic resources" (Stern 2000: 417).

Racial minorities and the poor are likely to be the most adversely affected by drought and environmental degradation more generally. Therefore, notions of environmental justice should be incorporated into public efforts to ameliorate the effects of drought on those at the bottom of the social pyramid. This is important because "by merging environmental, social equality and civil-rights movements into one potent political force, environmental justice advocates have considerable influence on public policy at all levels" (Cutter 1995: 113). Efforts to embark on more sustainable policies need to recognize that environmental issues should not be considered separate from social justice issues (Foster 1995).

To this end, Foster (1995) stresses that it is the poor who must be put first. This focus on meeting the basic needs of those at the bottom of the social pyramid should be considered before production or even the environment as "increasing production does not eliminate poverty" (Foster 1995: 14). Since gender, race, and class inequalities are structural in nature, policy efforts to take a more ecological approach to society's relation with the biophysical world should focus on institutions and structures. Putting the burden of change to more sustainable practices and on the individual is fundamentally misdirected (Foster 1995). Adequate environmental policy must focus on social structures and institutions that serve to keep race, class, and gender hierarchies in place. This point is especially apt given that my results reveal that race, class, and gender were the most significant predictors of water conservation behavior. Efforts toward more sustainable development that over emphasize the role of the individual are flawed

because they miss the fundamental inequalities that are tied to our society's conflictual relationship to the biophysical world.

Considering the significance of class variables in my analysis and the fact that Georgia's official poverty rate in 2007 was 13.5% (1.2% above the national average), efforts to embark on more sustainable water management, development, and policies should pay closer attention to those at the bottom of the social pyramid. Indeed, environmental exploitation is tied to the "exploitation of the poor by the rich" (Foster 1995: 14). Policy makers in Georgia would have to critically assess the viability of Atlanta's exponential growth and think creatively about possible ecologically sound futures. Rapid overdevelopment of growing metropolitan areas like Atlanta reinforces values and practices that drive social and environmental exploitation. Ineffectual forms of development and social organization in these areas are antithetical to any potential biophysical sustainability.

LIMITATIONS

Data used in this study have several limitations. Many of these are problems associated with telephone surveys and secondary data analysis in general. For instance, there is no guarantee that respondents answered any or all questions honestly. Data limitations also affected the research questions selected for the present study, as they were restricted to the data available. Also, individual level data have limited explanatory value, as my findings indicate.

There were also certain changes that had to be made to the data. After removal of missing cases my sample size was reduced to n=557 (originally n=800). Of these, there

were 78 missing cases across the seven water conservation categories. The 2007 Peach State Poll was conducted when bans on lawn watering and car washing (except at facilities that recycle their water) were mandated in the state of Georgia. In the categories where the respondents refuse to answer, it appears as though those people are reluctant to report truthfully because the behavior may be mandated, yet they may not be doing it.

SUMMARY

In this chapter, estimates of five separate models were presented. Results revealed that the significance of race, class, and gender variables confounded any significant association between water conservation attitudes, drought severity, or attention to drought news and water conservation behavior. Finally, I argued that efforts to embark on more sustainable development should place attention on social structures and institutions rather than placing the burden on individuals who are systematically denied the opportunity to engage in water conservation behavior.

CHAPTER V

CONCLUSION

This chapter examines the importance of the present study. I first summarize the thesis and then discuss the theoretical and policy significance of my work. I conclude by discussing several areas for future research.

SUMMARY OF THESIS

This study examined factors that affected Georgians water conservation behavior during the area's 2007 drought. Using data from the 2007 Peach State Poll, I estimated four bivariate models and one full model that included all covariates (Model 5). The Peach State Poll data highlighted Georgian's concern about their water during the region's 2007 drought and reflected the public awareness of water shortage during a specific place and time. Since public concern about specific environmental problems can help motivate the collective response needed to embark on more sustainable forms of social organization, this study examined factors that may have been associated with water conservation behavior during the drought.

Results of Model 5 revealed that differences in people's water conservation attitudes, political party orientation, severity of drought, and attention to drought news did not affect their water conservation behavior during Georgia's 2007 drought. The effect of race, class, and gender variables in the full model appear to have confounded any significant association between water conservation attitudes (Model 1), political party orientation (model 2), drought severity (Model 3), or attention to drought news

(Model 4) and water conservation behavior. These findings indicate that reinforcing drivers of social stratification, such as race, class, and gender may influence one's ability to engage in certain water conservation measures that may ameliorate the region's freshwater problem. It was argued that individualistic policy efforts are fundamentally flawed because certain individuals are systematically denied the opportunity to engage in water conservation behavior based on their placement in the larger social structure.

In chapter IV, I also discussed how future efforts to embark on more sustainable development should scrutinize the social structures and institutions that serve to reinforce race, class, and gender hierarchies rather than placing the burden of social and environmental change on the individual. This notion contains several important theoretical and policy implications that may inform collective action aimed at more equal and environmentally sustainable forms of social organization.

THEORETICAL SIGNIFICANCE

The fundamental theoretical significance of the present research is that water shortages are a societal problem. This divide between nature and society has taken on increasing momentum over the past five hundred years (Moore 2003). The results of which can be seen in situations of increased social vulnerability and drought.

In the past, people's lack of control over nature generated fear, which inhibited the ability to understand nature more conceptually. As society became increasingly differentiated (in the Durkheimian sense), peoples' dealings with nature became dominated by instrumental thinking and rationality (e.g., Horkheimer and Adorno 1947; Weber 1904; Elias 1939). It is through this process of increased differentiation and

rationalization that people have become more and more dependent on one another. This increasing interdependence has since given rise to differing forms of insecurity resulting from the antagonisms and tensions between groups (Kilminster 2007).

Elias (1987) has explained how as society becomes increasingly detached in relations to nature and things, people become increasingly involved in their relation to one another. Here Elias's notion of detachment refers to the widening of the gap between an impulse to act and the act itself. Using Elias's theory of involvement and detachment we can highlight the theoretical implications of increased involvement in interdependent social relations. Specifically, there is a marked push toward immediate gratification (involvement) when attempting to figure out the contradictions of society. Sociology is not apart from this process and to the extent that this is not acknowledged, research hides the general contradictions of society. This is why society's relationship to nature and water resources more specifically is hard to explain theoretically. This study underscores the theoretical significance of perspectives that help map the interaction between human society, unequal power, and the biophysical world (e.g. Bunker and Ciccantell 2007, Latour 2005, Harvey 2008, Foster 1999, Swyngedouw 2004). These perspectives are important because they highlight how environmental problems such as drought are reflective of the general problems of advanced society, such as unequal distribution of societal resources and the accumulation of capital by those at the top of the social pyramid.

In contrast, individualistic approaches to nature-society relationships are related to the general tendency to minimize the quality, quantity, and interrelatedness of points of

analysis. These restricted approaches are problematic because they bracket off all other relevant phenomena leaving no room for contextualization and thus ignoring important potential factors that may constrain policies toward more sustainable water management and development. The concept of the individual represents "an irreducible given" and the analysis of this concept was divided among biology, psychology, and philosophy (Frankfurt Institute for Social Research 1972: 37). Historically, the concept has been "distinguished by particular properties which are supposed to be assigned to it alone" (Frankfurt Institute for Social Research 1972: 38). Marx's notion of *species being* (1842) challenged this atomistic approach, but the dynamic between the individual and society is further complicated when one recognizes it cannot be considered apart from the relationship between the individual and nature.

The 2007 drought in Georgia can be used to illustrate this point quite well. For example, it is becoming increasingly difficult to legitimize unsustainable development in fast growing cities such as Atlanta because in recent years we have become more aware of the human induced environmental destruction this type of social organization produces. However, many times it is only when unlimited access to freshwater becomes problematic that the chance to acknowledge society's antithetical relationship to nature is made transparent. As mentioned, the 2007 Peach State Poll found that forty-one percent of the respondents cited drought as the most important problem facing the state, indicating the greatest public focus on a single issue in six years of polling (see Figure 1). However, in 2009—two years after Georgia's 2007 drought—Lake Lanier, which supplies a majority of water for Atlanta's sprawl development, was full for the first time in four years (Knoxville News Sentinel October 15, 2009). However, with water levels back to normal there is concern

that Atlanta's water overconsumption will continue and water regulations will become more lax. Kit Dunlap, president of the Greater Hall Chamber of Commerce in Atlanta explained to the press in the fall of 2009, "Everybody is so excited, but my fear is water conservation measures will go away," and "no matter where you live, we need to have conservation measures in place in our homes and business. I hope that attention won't go away now that we have plenty of water" (Knoxville News Sentinel October 15, 2009). Concern about water management and development issues need to be addressed continuously, not only when water levels are at a critical low. This is why a broad theoretical approach is necessary because such a perspective can help illuminate how water shortages are part of a continual and ongoing process of social and biophysical interactions. This means that research must resist attempts to bracket or fragment the complex and dialectic relationship between nature and society. To this end, theoretical work must historically locate the social forms that to a large extent dictate group behavior and which recursively constrain an individual's interaction with nature.

The ongoing interaction between the individual, nature, and society is "mediated through objects of one kind or another" (Law 1992: 381). The analytic point here is that one should not assume *apriori* that society or nature is the cause of social change or stability. As my results indicate, attempts to chop up nature-society issues into individualistic problems and causes are analytically problematic because they lose sight of the larger antithetical relationship between nature and society. Although my research took a micro approach by examining Georgian's reactions to water shortage during a specific place and time, the aim of Chapter II was to situate the 2007 drought in Georgia

within the basic antithesis between advanced forms of social organization and the well-being of the biophysical world. The history of water management in the Georgia area was outlined by focusing on the interrelated processes of global warming, development, and water management.

Since water shortages are still affecting millions of people around the world, there is the need for continued theoretical research that helps circumscribe this ongoing problem. Human-induced environmental problems are accelerating in part because they are driven by forms of social organization that create and maintain a momentum that seems to defy change (Schnaiberg 1980; Eitzen and Zinn 2009). On a conceptual level, environmental resource scarcity is continuously reinforced through broad and complex social-psychological contexts that affect the environmental actions pursued in any given society (Homer-Dixon 2001). That is, people continuously relate themselves in their interactions with others and the biophysical world while their activities are simultaneously articulating a particular dynamic internal balance of psychic functions (Kilminster 2007). This interplay is recursive and is characterized by the "circular movement between inner and outer controls", which creates "a feedback mechanism of a kind" (Elias 1987: 11). However, in the US, where economic growth and development dictate our relationship to water resources, the "social visibility" of human-induced environmental impacts is greatly reduced (Schnaiberg & Gould 2000).

Theorists must be reflexive enough to conceptually remap (if necessary) their assumptions and implications in light of new knowledge. Here it is important to distinguish the question of what the relationship between the individual, nature, and

society *ought* to be and what kind of relationship actually exists (e.g. Latour 2005; Elias 1987). This task is especially problematic for sociologists because they are more directly involved in what they are studying.

This theoretical reflexivity must also engage the critique necessary to expose the underlying and recursive elements of social/ideological domination at work in the US today. That is, who benefits from water policies and development initiatives? Who does not? Who are the key political and economic players involved? What patterns can be identified regarding the organizational structures that guide their action? How is power centralized in these relationships?

Actor Network Theory (ANT) and eco-Marxist theories are examples of some of the most sustained perspectives that attempt to critically map the relationship between human society and the natural world. ANT and eco-Marxist thinkers have both been concerned with the agency of nature. For these thinkers, the issue of natural agency radicalizes the so-called nature/society divide and the danger of giving analytic primacy to one or the other.

For Latour (2005), the problem of agency is based on the scientist's obligation to choose a point of departure from which analysis is to follow. He explains that the "point is not to decide who is acting and how but to shift from a certainty about action to an *uncertainty* about action…to decide what is acting and how" (2005: 60). Latour's (1993) notion of "quasi-objects" or "hybrids" and Swyngedouw's (1999) discussion of "socionature" are both attempts to overcome the "great divide" between nature and society by focusing on the ways various complex structures and systems are "all *effects*

generated in patterned networks of diverse (not simply human) materials" (Law 1992: 380).

Although certain strands of dialectical thought (Ollman 2003) have drawn upon Marx to think about change without apriori conceptualizations, they are often criticized for ignoring the difficulty of knowledge production. For example, while pointing out the commodification of nature; many Marxists have relied, at least implicitly, on one essential commodified nature thus misunderstanding the explanatory and normative elements of Marxist thought (Castree 2002). Likewise, Latour (2007) has stressed the risk of confusing the reproduction of the parts of nature through research, and the reproduction of the parts themselves.

Similarly, Gellert (2003) has stressed the importance of acknowledging the historical production of such socionatures or quasi-objects and the need to recognize how human and biophysical change is subject to a multiplicity of contingencies and therefore never comprehensibly known. The tendency to conceive of the socionatural environment as a homogenous rather than heterogeneous process is indicative of the "apriori-ism" that has plagued a majority of social science and Western thought in general. The real theoretical challenge that remains is how to engage adequate ways of circumscribing the specific commodifications of natures while simultaneously remaining critical and open about the knowledge construction that is required for this to take place.

Broad, reflexive, and critical theory is necessary in light of the present research and is directly related to the policy significance of my work for many reasons. Results indicate that the factors that greatly influenced water conservation behavior (race, class,

and gender) during Georgia's 2007 drought are structural in nature. Although structural factors clearly affect the individual, explanations cannot be reduced to the individual. If research gives primacy to the individual, then analysis confuses the relationship between individual and social structure. Since the 2007 Peach State was created to provide policy makers with information about Georgian's reactions to the drought, attention should be given to the various structural factors which have been shown to inhibit water conservation behavior. However, this is made problematic because it is often those that are in a position to create sound environmental policy that benefit from society's unequal social arrangements (Mills 1958, Johnson 2001, Foster 1995).

POLICY SIGNIFICANCE

The policy significance of the present research relates to the social categories that people inevitably find themselves in, and which are out of the individual's ability to arbitrarily change. Categories such as race, class, and gender are "created and shaped by forces and barriers which are neither accidental or avoidable, but are systematically related to each other in ways that confine individuals to the extent that movement in any direction is penalized" (Bailey 1998: 302). Social categories systematically produce oppression because oppression "is a structural phenomenon that devalues the work, and voices of members of marginalized social groups" (Bailey 1998: 303). This categorization is so powerful because it dictates the self merely by being part of a social group. As Bailey (1998: 303) notes, "oppression is experienced by persons *because* they are members of particular social groups".

The present study reveals how social categories constrain an individual's ability to conserve water. In times of extreme water shortage there is obviously a greater need for individuals to conserve water. However, as my results indicate, the ability of an individual to engage in water conservation behavior is contingent upon an individual's placement into social categories such as race, class, and gender even when the majority of the population is concerned and affected by drought. That is, because of their placement in certain social categories, individuals may not have the opportunity to conserve water. For example, the poor, who are less likely to own cars do not have the opportunity to wash their cars less often.

Since gender, race, and class inequalities are structural in nature, policy efforts to take a more ecological approach to society's relationship with the biophysical world should focus on institutions, structures, and power inequality. Policy appeals to individual members of society are flawed because they ignore the material and social relationships that account for power inequality (Burkett 2006). Implicit in individualistic policy efforts is the assumption that the morality of the individual alone is essential to the morality of society (Foster 1995). Such approaches are fundamentally flawed because the various forms of social inequality within any given population are too often not taken into account.

A prime example of this type of individualistic policy research is contingent valuation (CV), a survey-based research method that asks respondents to place a monetary value on environmental goods is a prime example. In CV surveys respondents are usually asked how much they are willing to pay or willing to accept to conserve some

aspect of the environment. Proponents of CV (e.g., Mitchell and Carson 1990; Hanemann 1994) argue that placing a monetary value on an environmental good provides an objective basis for sound policy. However, what is not made explicit in CV studies is how market forms of valuation are rooted in class relationships (Burkett 2006). Most CV studies ignore production, accumulation, and the centralization of societal resources that takes place in capitalist forms of social organization. The problem is that all of these processes greatly influence an individual's ability and willingness to pay[2].

In contrast to individualistic approaches, policy makers should pay close attention to how social categories of race, class and gender are sustained by individuals through their continual interaction within the stratification system. However, this is problematic because our continual interaction within this system simultaneously hides unequal power distribution. Therefore, policy efforts should be informed by the type of theoretical reflexivity discussed above and go beyond just a change in how we "see and interact within stratification systems" (Johnson 2001: 9).

Appeals to individuals at the top of the social pyramid are problematic because these individuals are likely to be members of privileged social groups. This is why policy too often reflects the interests of these dominant groups. The practical challenge then is to examine how members of these groups "see how their privileged social position diminishes everyone and blocks their potential to be part of the solution" (Johnson 2001:

[2] Using the 2007 Peach State Poll data and logistic regression techniques, I computed the odds ratios, regression coefficients, and standard errors resulting from regressing a respondent's willingness to pay for an annual water quality regulation fee on water conservation attitudes, political party orientation, drought severity, and water conservation behavior. One full model was also estimated that included all covariates. In the bivariate models, the results were inconclusive. Full model estimates revealed that those who earned more annually were more willing to pay for an annual water quality regulation fee. I also tested for the possible interaction between water conservation attitudes and behavior. The results of which were inconclusive.

157) while providing research that leads toward more democratic environmental policy from the ground up. Grassroots organizations like the Coordiadora de Defense de Agua y la Vida in Bolivia; the Narmada Bachao Andolan in India; the Concerned Citizens of Newport, and the Michigan Citizens for Water Conservation in the US are examples of how relatively powerless people around the world are fighting back against unjust water policies. Citizens can collectively organize to encourage water conservation by targeting politicians that have the power to implement policies that curb water usage for all, not just the wealthy.

To this end, combining social and environmental justice can be a powerful tool in efforts to combat unequal power distribution while providing potential avenues for social and environmental change. Social and environmental justice must put people first (especially the poor), instead of production, or even the environment, "stressing the importance of meeting basic needs and long-term security" (Foster 1995: 15). This brings me back to the main policy importance of my research, which is that the social stratification system fundamentally denies the opportunity for members of a given population to engage in water conservation behavior. Because race, class, and gender are reinforced and legitimated in everyday life, unequal power distribution constrains water conservation behavior even during extreme water shortages when all members are negatively affected.

Therefore, efforts toward environmental justice should examine "why inequalities in wealth and power are *systematically dependent* on environmentally degrading activity" (Burkett 2006: 215). Here, close attention needs to be paid to the unequal distribution of

societal goods. Ideally, water resource management and sustainability should treat water as a common property. As Burkett (2006) notes, "common-property systems 'include procedures for making decisions that affect the group as a whole, and methods for enforcing those decisions'" (Quiggin 1998: 1080, quoted in Burkett 2006: 312). To this end, regulations that discourage accumulation by a few at the top of the social pyramid would have to depend on legislation and enforcement that is fair, democratic and transparent (Burkett 2006).

The present research indicated that individualistic approaches to nature-society relationships are theoretically problematic. We encounter additional problems when individualistic approaches guide environmental policy. This is because "individualism does not mentally prepare us to recognize how interconnected we all are with our surroundings, both social and environmental" (Bell et al. 2008: 144). The individual level analysis engaged in the present study does not allow us to fully grasp complex nature-society relationships, but it does tell us something about how our society operates. My research showed how social categories such as race, class, and gender greatly constrain individual environmental behavior. To the extent that this is not recognized analysis perpetuates the illusion of equal opportunity for all, which is obviously not the case in highly stratified societies such as the US. Therefore, individual level analysis should focus on how unequal power relationships affect environmental behavior. This work is important because it can provide empirical examples of unequal power. However, since individual level analysis has limited explanatory power it must be

combined with an historical examination of how various social forms dictate individual behavior.

AREAS FOR FUTURE RESEARCH

There are several areas for future research. Work is needed that examines the political economy of the water industry, the role of the media, and alternative forms of social organization. A majority of the world's water is owned by a few giant corporations while populations around the world do not have adequate access to fresh water (Barlow and Clarke 2002). Corporate exploitation of water resources, accompanied by government initiates established under the "Washington Consensus", which has generated discussions of an emerging water cartel (e.g. Barlow and Clarke 2002). Work is needed to highlight emerging organization structures that guide corporate control, ownership, and distribution of water. This work must also concentrate on unequal power distribution and its interaction with non-decision making. Since human's dependence on water is inescapable, this work should include the theoretical reflexivity and critique discussed above to expose how corporate "go green" initiatives are incorporated into the apparatus of society.

Another area for future research is the role played by the media during water shortages. As mentioned, accurate and transparent coverage of specific environmental events is important in informing the general public and pushing decision-makers to act. However, corporate media ownership is highly centralized, which has the effect of "creating a greater illusion of individual control and freedom at the same time that it

legitimizes corporate resistance to collective public control" (Schnaiberg and Gould 2001: v).

To the extent that people are uninformed or misinformed, environmental citizenry falls short. Research examining the role of the media during water shortages should scrutinize the extent to which environmental issues are made transparent. This work should remain critical, as to account for the "proliferation of greenwashing by corporations utilizing expanding and intrusive media" (Schnaiberg and Gould 2001: v). To this end, the push toward an environmental political economy of the media is needed.

A final area for future research involves new and imaginative alternative possibilities for more sustainable forms of social organization and water management. There are various ways that humans can organize themselves in relation to the natural environment. This research must also account for how those with policy making power have a vested interest in keeping this power centralized and are likely to resist efforts toward more democratic water policies. Water shortage is and continues to be a major problem. In the US and around the world, societies are struggling with inadequate access to freshwater. Future research should include an examination of the structural and cultural factors that deny sound policy and equal distribution of power.

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APPENDICES

APPENDIX A: 2007 PEACH STATE POLL

[WATER]

INT3. Now, I would like to ask you some questions about Georgia's freshwater resources.

[Randomize order of W2 and W3]

W1. How concerned are you about the QUALITY of water in Georgia? Would you say you are
very concerned, somewhat concerned, or not at all concerned? [Note to interviewer: please
emphasize quality and be sure that the respondent is not focused on the shortage of water.]

1 Very concerned
2 Somewhat concerned
3 Not at all concerned
8 DK / No Opinion (vol.)
9 Refused (vol.)

W2. How concerned are you that Georgia may not have enough water in the next ten years?

Would you say you are very concerned, somewhat concerned, or not at all concerned?
1 Very concerned
2 Somewhat concerned
3 Not at all concerned
8 DK / No Opinion (vol.)
9 Refused (vol.)

W3. Please rate the QUALITY of Georgia's lakes, rivers, and streams; these are the waters used
for drinking and recreational activities? Do you think that Georgia's lakes, rivers, and streams are in excellent condition, good condition, fair condition, or poor condition?

1 Excellent condition
2 Good condition
3 Fair condition
4 Poor condition
8 DK / No Opinion (vol.)
9 Refused (vol.)

W4a. To improve the quality of lakes, rivers, and streams – waters used for drinking and

recreation – in your area of the state, would you oppose a $5 yearly fee?
1 Yes, would oppose a $5 fee .. Skip to W5a 2 No, would not oppose a $5 fee

8 Not sure (vol.) .. Skip to W5a
9 Refused (vol.) .. Skip to W5a

W4b. How about a $10 yearly fee? Would you oppose a $10 yearly fee to improve the quality
of water?
1 Yes, would oppose a $5 fee .. Skip to W5a
2 No, would not oppose a $5 fee
8 Not sure (vol.) .. Skip to W5a
9 Refused (vol.) .. Skip to W5a

W4c. Would you oppose a $25 yearly fee to improve the quality of water?
1 Yes, would oppose a $5 fee .. Skip to W5a
2 No, would not oppose a $5 fee
8 Not sure (vol.) .. Skip to W5a
9 Refused (vol.) .. Skip to W5a

W4d. Would you oppose a $50 yearly fee to improve the quality of water?
1 Yes, would oppose a $5 fee .. Skip to W5a
2 No, would not oppose a $5 fee
8 Not sure (vol.) .. Skip to W5a
9 Refused (vol.) .. Skip to W5a

[SPLIT SAMPLE EXPERIMENT – randomly assign respondents to either Version A or Version B]

[Version A]

W5a. In considering water quality for drinking, how important or unimportant is the smell or odor of the water … (Read response options as necessary)
1 Extremely important
2 Somewhat important
3 Somewhat unimportant
4 Completely unimportant
8 Not sure (vol.)
9 Refused (vol.)

W5b. In considering water quality for drinking, how important or unimportant is it that the water is clear, not cloudy … (Read response options as necessary)
1 Extremely important
2 Somewhat important
3 Somewhat unimportant

4 Completely unimportant
8 Not sure (vol.)
9 Refused (vol.)

W5c. In considering water quality for drinking, how important or unimportant is the color of the water … (Read response options as necessary)
1 Extremely important
2 Somewhat important
3 Somewhat unimportant
4 Completely unimportant
8 Not sure (vol.)
9 Refused (vol.)

[Version B]

W5a_2. In considering water quality for recreation, how important or unimportant is the smell or odor of the water … (Read response options as necessary)
1 Extremely important
2 Somewhat important
3 Somewhat unimportant
4 Completely unimportant
8 Not sure (vol.)
9 Refused (vol.)

W5b_2. In considering water quality for recreation, how important or unimportant is it that the water is clear, not cloudy … (Read response options as necessary)
1 Extremely important
2 Somewhat important
3 Somewhat unimportant
4 Completely unimportant
8 Not sure (vol.)
9 Refused (vol.)

W5c_2. In considering water quality for recreation, how important or unimportant is the color of the water … (Read response options as necessary)
1 Extremely important
2 Somewhat important
3 Somewhat unimportant
4 Completely unimportant
8 Not sure (vol.)
9 Refused (vol.)

[END SPLIT SAMPLE]

W6. How important do you think it is for Georgia's residents to conserve water? Do you think it
is very important, somewhat important, or not at all important? [Interviewer note: If asked,
"conserve" simply means to use less.]

1 Very important
2 Somewhat important
3 Not at all important
8 DK / No Opinion (vol.)
9 Refused (vol.)

W7. People can engage in several behaviors to reduce the amount of water they use. For each of
the following, please tell me whether you are very likely, somewhat likely, or not at all likely to do this or if this is something you already do. [RANDOMIZE ORDER OF ITEMS
a THROUGH g]

The first is (READ ITEM).

How about (NEXT ITEM)? (PROBE IF NEEDED: Please tell me whether you are very likely, somewhat likely, or not at all likely to (ITEM) or if this is something you already do.

a. Take shorter showers
1 Very likely
2 Somewhat likely
3 Not at all likely
4 I already do this
8 DK / No Opinion (vol.)
9 Refused (vol.)

b. Use faucets less (e.g. turn off while brushing teeth, scrubbing dishes, etc.)
1 Very likely
2 Somewhat likely
3 Not at all likely
4 I already do this
8 DK / No Opinion (vol.)
9 Refused (vol.)

c. Water your lawn or garden less often
1 Very likely
2 Somewhat likely
3 Not at all likely
4 I already do this
8 DK / No Opinion (vol.)
9 Refused (vol.)

d. Wash only full loads of clothes and dishes
1 Very likely
2 Somewhat likely
3 Not at all likely
4 I already do this
8 DK / No Opinion (vol.)
9 Refused (vol.)

e. Wash your car less frequently
1 Very likely
2 Somewhat likely
3 Not at all likely
4 I already do this
8 DK / No Opinion (vol.)
9 Refused (vol.)

f. Routinely check fixtures for leaks
1 Very likely
2 Somewhat likely
3 Not at all likely
4 I already do this
8 DK / No Opinion (vol.)
9 Refused (vol.)

g. Flush toilets less often
1 Very likely
2 Somewhat likely
3 Not at all likely
4 I already do this
8 DK / No Opinion (vol.)
9 Refused (vol.)

W8. Do you think that households that use a higher than average quantity of water should pay
higher rates per gallon than households that conserve water?

1 Yes, should pay higher rates
2 No, should not pay higher rates
3 It depends (vol.)
8 Not sure (vol.)
9 Refused (vol.)

W9. How much attention have you paid to news about the drought in Georgia – a great deal,
some, very little, or none at all?

1 A great deal
2 Some
3 Very little
4 None at all
8 DK / No Opinion (vol.)
9 Refused (vol.)

W10. How much influence has the drought had on your daily activities – a great deal, some,
very little, or none at all?

1 A great deal
2 Some
3 Very little
4 None at all
8 DK / No Opinion (vol.)
9 Refused (vol.)

W11. How much influence has the drought had on the behaviors you have taken to conserve
water – a great deal, some, very little, or none at all?

1 A great deal
2 Some
3 Very little
4 None at all
8 DK / No Opinion (vol.)
9 Refused (vol.)

W12. How likely are you to continue these water conservation behaviors – very likely, somewhat
likely, not at all likely?

1 Very likely
2 Somewhat likely
3 Not at all likely
8 DK / No Opinion (vol.)
9 Refused (vol.)

APPENDIX B

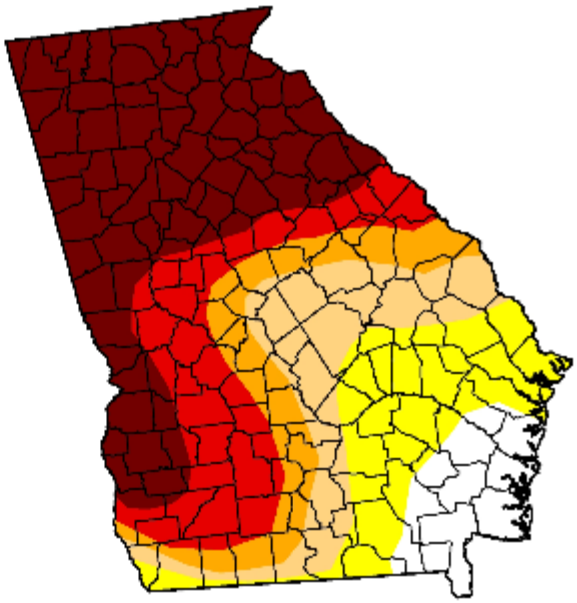
U.S. Drought Monitor

November 27, 2007
Valid 7 a.m. EST

Georgia

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	7.9	92.1	76.9	63.4	53.3	37.0
Last Week (11/20/2007 map)	7.9	92.1	77.1	63.5	53.3	36.9
3 Months Ago (09/04/2007 map)	14.5	85.5	72.2	60.0	40.7	19.0
Start of Calendar Year (01/02/2007 map)	12.2	87.8	3.7	0.1	0.0	0.0
Start of Water Year (10/02/2007 map)	24.2	75.8	64.2	52.6	39.4	27.0
One Year Ago (11/28/2006 map)	82.2	17.8	4.1	0.1	0.0	0.0



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements

http://drought.unl.edu/dm

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Author: Brad Rippey, U.S. Department of Agriculture

VITA

Alexander Martin Stoner was born February 7, 1985. He completed his BS in sociology at Bradley University in 2007, and will complete his MA in sociology at the University of Tennessee, Knoxville in 2010. His research interests include environmental sociology, political economy, and social theory.