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STEPHEN R. PENNINGTON

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**PSYCHOLOGICAL DETERMINANTS OF THE INTENTION TO
SUPPORT WATERSHED BEST MANAGEMENT PRACTICES**

By

Stephen R. Pennington

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ABSTRACT

PSYCHOLOGICAL DETERMINANTS OF THE INTENTION TO SUPPORT WATERSHED BEST MANAGEMENT PRACTICES

By

Stephen R. Pennington

There is a major effort by the United States Environmental Protection Agency to convince municipalities to manage their water resources on a watershed basis. Unfortunately, there is little information as to how citizens think about managing water resources. This study uses two psychological instruments, the fairness heuristic and the theory of planned behavior in order to better understand the watershed best management practices (BMPs) people intend to support. Using a mail survey (n = 608) of property owners there were two key attitudes found to be held by the sample population, one based on the rights of the environment and the other reflecting people's resistance to change. It was found that these attitudes are mediated by people's fairness evaluations of the process in which policy is developed. Cluster analysis based on the two attitudes showed respondents held two different worldviews: individualist and egalitarian. Determinants of the intention to support BMP implementation for the individualist cluster were attitudes and locus of control whereas for the egalitarian cluster it also included personal responsibility and level of education. Knowledge was not a determinant for either cluster. Findings suggest that worldviews are a stronger predictor of the intention to support BMP implementation than knowledge.

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I dedicate this dissertation to my wife, Kirsten. Not only did she provide support and encouragement throughout, but together with our newly born daughter, Emilee, they have taught me the true meaning of life.

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CHAPTER I:

INTRODUCTION AND STATEMENT OF PROBLEM

Twenty-five years of water pollution regulation under the 1972 Clean Water Act (CWA) has failed to achieve its stated goal to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters" [CWA, 1972] largely because of the Environmental Protection Agency's (EPA) inability to control nonpoint source pollution. Nonpoint source (NPS) pollution or polluted runoff remains a leading cause of water pollution in both agricultural and urban areas (USEPA, 1997) and therefore the impacts are everywhere. Regardless of the large expenditures by industry and municipal wastewater systems to reduce point source pollutions, forty percent of the United States' waterways still do not meet the minimum federal guidelines (USEPA, 1997).

The Clean Water Act addresses water quality problems in two ways. The Act requires states to identify waterbodies whose quality does not support their designated beneficial uses. Total Maximum Daily Loads (TMDLs) must then be developed for each of the listed segments based on the assimilation capacity of the system. In many cases, structural best management practices (BMPs) have to be implemented to obtain the required reduction in pollutant concentrations.

In addition, Phase I of the National Pollution Discharge Elimination System's (NPDES) stormwater program requires medium and large cities (100,000+ people) to obtain permits for the discharge of stormwater runoff. Phase II of the stormwater program targets municipalities under 100,000 people and requires them to have stormwater management plans in place by March, 2003. These permits contain requirements for implementation of BMPs mostly nonstructural, however, there is a growing awareness

that additional measures such as structural BMPs, may be necessary to achieve the desired quality of storm water discharges. Many metropolitan and regional agencies also require stormwater treatment in environmentally sensitive areas. Consequently, structural BMPs designed to improve water quality are being installed at an unprecedented rate (Barrett, 2000; Roesner, Bledsoe, & Brashear, 2001).

Conventional structural BMPs include extended detention basins, biofilters (vegetated strips and swales), sand filters, infiltration devices and wet basins to name a few. Nonstructural BMPs typically take the form of management guidelines, regulations and information and education (I & E) programs. Under pressure from regulators, environmentalists and other stakeholders, structural BMPs are often installed without regard to the nature of the impairment of the receiving water nor the impact to the local community (Barrett, 2000). The goal of this research is to understand how people think about their local watershed and the BMP strategies for improving water quality they would support.

Water-resource scientists have presented a convincing case over the years for giving greater weight to the human dimensions of water management, but have identified a number of problems in trying to accomplish this goal (Dunlap & Scarce, 1991; Harris, 1977; Kempton, Boster, & Harley, 1995; Satterfield & Gregory, 1998). Over 30 years ago, Biawas and Durie (1971) argued that water resource decisions ought to be based primarily on social criteria because the ultimate goal is to improve the quality of human life. They suggested that planners not restrict themselves to technical and economic measures in evaluating alternatives, but seek out and apply human dimension factors as well. Since that time, many researchers, including Biawas (1973), have concluded that

incorporating social dimensions will make the planning process more relevant and meaningful, but at the same time will render a complicated process even more complex (Dunlap & Scarce, 1991; Harris, 1977; Satterfield & Gregory, 1998; Syme & Nancarrow, 1997b).

There has been surprisingly little research on whether there are consistent dimensions in the ways in which people integrate their thoughts about water resources. The studies available have been conducted from the perspective of a particular activity, use or amenity associated with water. For example, Syme and Williams (1993c) examined the structure of perceptions in the context of the aesthetics of drinking water. Smith and colleagues (1991, 1992) have examined color and clarity in terms of recreational use of water for bathing. Other authors have discussed the meaning of water in cultural or spiritual terms (Woolmington & Burgess, 1983). Yet, there are a few research studies that try to empirically substantiate the dimensions surrounding water resources.

In the context of water planning, Harris (1977) provided the first multi-dimensional analysis of the conceptions of water in an attempt to find some underlying dimensions that could assist planners within a multi-objective decision-making framework. With a sample of three hundred respondents from disparate subgroups, he used multi-dimensional scaling techniques to find five principal vectors relating to (1) quality of drinking water, (2) allocation and conservation, (3) natural beauties of water, (4) public involvement and (5) public access to water bodies. These vectors were consistent between subgroups (e.g. social scientists and water engineers).

Nancarrow et al. (1996-97) found similar dimensions existed in their two studies. The first study was conducted on 1080 residents of three Australian cities (Perth, Canberra and Sydney) while the second, conducted two years later, was a socio-economic stratified sample of the residents of Perth. Both used personal interview methodology for administering the questionnaire. They found three common factors: aesthetics, conservation and utility. When they tried to cluster respondents based upon these factors a four-cluster solution was obtained. They named these: "Self-Interested", "Earthy", "Environmentalists" and "Service Oriented" people. Interestingly, when the water rights statement was included, the difference between the cluster means for the three factors mentioned above was not evident. It was found that the water rights statement removed the discriminating influence between clusters.

In recent years the concerns about increasing the efficiency and effectiveness of water management have meant that issues such as property rights, the rights of the environment and the social and economic bases underpinning management decisions have demanded greater attention (Syme & Nancarrow, 1997a). The basic underlying themes in most planning disputes relate to what is just, fair and equitable in terms of who should benefit from planning, who should bear the costs and how should the decisions be made (Syme & Nancarrow, 1997b). Government policies constantly state that resources will be allocated equitably, yet the area that has received the least attention is the definition of what is just, fair or equitable as seen by the range of stakeholders in watershed planning decisions (Syme & Nancarrow, 1997b).

Syme and Fenton (1993a) attempted to examine the structure of equity and proportional preferences (Rasinski, 1987) for allocation decision-making for groundwater

in Perth, Australia. There was a partial replication of Razinski's two-factor (equality and proportionality) structure of equity. Furthermore, there was a stated preference for arbitration procedures in dispute settlement (Lind & Tyler, 1988).

Despite these encouraging results, the qualitative feedback from respondents indicated that the two-factor notion of equity did not incorporate all the subtleties of values that people consider to be important in water allocation planning. Also, the preferences provided by the Razinski's (1987) framework were thought by some to be too simple for decision-making with multiple conflicts. As a result of these conclusions, a series of studies aimed at establishing universal fairness criteria were undertaken.

The second study tried to broaden the measures of the philosophical basis (Wenz, 1988) on which the community might derive fairness perceptions. Such concepts as people's attitudes towards short and long-term planning and the concept of procedural justice were tested from a wider philosophical base (Syme, Nancarrow, & McCreddin, 1999). The 111 philosophical statements moved from virtue theory (people who already have the resource are inherently deserving), through ideas of the common good and differing formulations of benefit/cost analysis. When the philosophical questions were examined thematically, there was very clear support for the following positions: (1) water is a common good and should be managed for the welfare of the community as a whole; (2) more than market mechanisms are required for an adequate holistic allocation policy; (3) efficiency of use is an important component when considering allocation; (4) there is a moral obligation that human users affect others as little as possible; (5) water quality should be considered as well as quantity; (6) there is an obligation for general public

information or involvement in allocation decisions; and (7) the environment has allocation 'rights'(Syme & Nancarrow, 1996).

Interestingly, there was only a modest correlation between long-term planning (certainty) and agreement on allocation decisions being short-term and dependent on the circumstances at the time (Syme & Nancarrow, 1996). The interaction between these dimensions would seem to indicate the importance of framing fairness judgments in particular situations. This led to the adoption of universal fairness and situational fairness principles in later studies (Syme & Nancarrow, 1996). Universal fairness criteria are guiding principles used to evaluate all decisions where as situational principles arise only when the outcome is likely to impact the community or the individual. Also lending support to this dichotomy was the fact that respondents tended to support prior rights in their allocation priorities, but they did not support items measuring attitudes towards prior rights as a universal principle. Therefore, the subsequent studies made the conceptual distinction between fairness principles being applied differently at the universal and situational levels (Syme & Nancarrow, 1996).

Several other studies served to refine and substantiate Syme and his colleagues (1999) findings under a variety of circumstances. For instance, the third study refined and applied the universal philosophies to actual decision-making systems and provided specific criteria by which overall fairness could be evaluated. Studies four, five and six which were a mixture of both qualitative and quantitative approaches, tested the fairness heuristic under differing political and social circumstances as well as over time. As a result, Syme et al., (1999) confidently make the following assertions with regard to water allocation planning in Australia:

- A large portion of people believe in the rights of the environment and its preservation for a range of uses for future generations.
- Fair decision-making processes are of paramount importance to community acceptance of water allocation decisions.
- Water markets alone are not considered fair or acceptable processes for allocating or re-allocating water.
- Economic arguments are of a lesser importance to process considerations when deciding how water should be allocated or re-allocated.
- Efficiency of use is a major determinant of the fairness of water allocation systems.

The lessons learned from studying water allocation in Australia are more relevant in the United States today than ever before. This is because the Environmental Protection Agency and its designated state agencies have adopted a decentralized approach to watershed management (USEPA, 1997). Under this approach, public participation and deliberative decision-making procedures allow for strategies to emerge as a result of a process which brings to the table all relevant social, environmental and economic matters (USEPA, 1997). The traditional institutional lines become blurred with new formal and informal linkages being established depending upon the requirements of the intended actions (Burroughs, 1999). The aim is to create local learning organizations that have the ability to adapt to ongoing changes presented by their operating environment (Bawden, 1995).

Clearly if the EPA approach is to succeed, the process must balance the needs of multiple users and uses in planning efforts and it should maximize acceptance of decisions through perceptions of having been treated 'fairly'. Conflicts in values have increased as utilitarian views are being replaced with a more environmental orientation (Brown & Harris, 1992; Dunlap & Van Liere, 1978; Eckersley, 1992; Stern, Dietz, Kalof,

& Guagnano, 1995). Gallup data (Gallup, 1989) for example, show that 75% of the population now claims to be environmentalist. Researchers attribute this shift in value orientation to population growth (Manfrado & Zinn, 1996) and changes in the nation's demographics (Steel, List, & Shindler, 1994). For example, younger, more educated, urban dwellers tend to de-emphasize traditional uses of forests (e.g., logging, mining, grazing) and place higher values on issues such as wildlife preservation. There is little reason to assume that watershed issues would be any different.

Because these trends are likely to continue into the future, it is important for managers to better understand the implication that diversely held values can have on planning initiatives. Theory predicts that more general value orientations affect attitudes regarding specific objects and/or situations and attitudes, in turn, influence behavior (Ajzen & Fishbein, 1977). As was just presented, Syme's (1993,1996,1999) work suggests attitudes are moderated by fairness evaluations. Never the less, several recent studies stress the importance of environmentally centered values (including fairness) in guiding policy and management actions (Dunlap & Scarce, 1991; Kempton et al., 1995; Satterfield & Gregory, 1998). It has been argued by Gregory, Keeney, and von Winterfeldt (1992) that it is essential for environmental managers to listen closely to the concerns, fears, wisdom and preferences voiced by the people who might potentially be affected by their actions. Also, a substantial body of evidence supports the notion that experts and laypersons often view the world quite differently (Slovic, 1987). The real question then becomes how do we respond to these differences in both the planning process and subsequent outcomes?

Although the importance of including human factors in water resources planning has been discussed at length, a surprisingly limited amount of research has emerged within the context of American watersheds. As a result, a critical need exists to define and describe the human domain surrounding planning within American watersheds. Logically, little can be done towards incorporating human factors into the planning-decision process without a clear delineation of the applicable factors, a description of how the factors relate to each other and an assessment of the relative values with which the factors are held.

Theoretical Perspective

This research uses an attitudinal model to guide the exploration of the relationships between the antecedents variables for the intent to support the implementation of BMPs. Based upon Hines, Hungerford, and Tomera's (1986) hypothesized model the antecedents of 'knowledge of environmental issues', 'knowledge of action strategies', 'locus of control', 'attitude' and 'personal responsibility' are used to predict behavioral intentions towards proposed BMPs. This model is consistent with Azjen's "Theory of Planned Behavior" (Ajzen, 1985), one of the most cited behavioral theories. According to his theory, *intention to act* has a direct effect on behavior and can be predicted by *attitude, subjective norms and perceived behavior control*. Individual values underlie both a person's worldview and their attitudes. Therefore, people possessing similar attitudes within a population (i.e., they have the same general attitude towards an object) are often said to have the same worldview (Dake, 1991, 1992) and would likely have many shared values.

Hines, Hungerford and Tomera's (1986) meta-analysis of variables related to environmental behavior can be categorized into cognitive, affect and situational factors. The cognitive factor, that is the awareness level about the object, is related to knowledge of the environment including action skills and strategies. The affect variables, or feelings and emotions associated with the objects, are generally defined by attitude, locus of control and responsibility. Situational factors such as economic and social constraints and/or pressures and opportunities to choose different actions either counter act or strengthen the cognitive and affect factors.

Several researchers have suggested that an individual's attitude towards the management of a resource is moderated by their perception of the fairness of the process as well as outcomes of the proposed decisions (Peterson, 1994; Syme & Nancarrow, 1997b; Syme et al., 1999). One research instrument designed to capture these interactions is the fairness heuristic. The heuristic provides a range of fairness criteria that may contribute to stakeholders overall fairness evaluations, making it possible to understand the elements of a community's view on the appropriate basis for decision-making. The fairness heuristic has been successfully used in the area of water allocation in Australia. Its mix of attitudes towards water, planning attitudes and lay philosophies make it an appropriate theoretical foundation on which to base research in American watersheds.

The concept of procedural justice and the demonstration of its significance gained prominence in Lind and Tyler's seminal book - *The Social Psychology of Procedural Justice* (Lind & Tyler, 1988). Procedural justice research focuses on the characteristics of a decision-making process which make it seem 'just' to people vulnerable to the consequences of a decision (Rasinski, 1987). General dimensions of procedural justice

such as voice or the feeling that one has had the opportunity to influence the process have been demonstrated and replicated (Axelrod, 1994). The major hypothesis of procedural justice is that if procedural justice is demonstrated in a decision-making process, the outcome is more likely to be accepted (Axelrod, 1994; Lind & Tyler, 1988; Rasinski, 1987; Syme et al., 1999; Thibaut & Walker, 1975). Distributive justice as a concept relates to the evaluation of whether an outcome was just in terms of the distribution of resource between stakeholders. In this way, equity and distributive justice are closely related. The dimensions of equity seem to be the bases on which individuals assess whether or not distributive justice has been achieved.

One of the purposes of this study is to better understand the groups of respondents holding different viewpoints about implementing BMPs within Sycamore Creek watershed in Ingham County, Michigan. Consequently, there is a need to provide a theoretical foundation for these groupings; several theories are available, but one based on people's worldviews about the environment seems appropriate. The relational pattern of worldviews put forth by Karl Dake (1992) is rooted in cultural theory. He describes five patterns of interpersonal relationships surrounding the perceptions of environmental risk: hierarchical, individual, egalitarian, fatalist and autonomous. These relational forms are hypothesized to engender shared representations of how the environment is viewed (Douglas, 1985; Douglas & Wildavsky, 1982) and will be used to guide analysis.

The planning literature is replete with examples of framing the perceptions of a problem differently (Messick, 1993). The framework ranges from the general to the more specific where the outcome is likely to impact either the community or the individual. These two terms have been differentiated in the literature by the terms *universal* fairness

and *situational* fairness (Lind & Tyler, 1988; Syme & Nancarrow, 1996). The values that contribute to these overall judgments are labeled fairness criteria.

The varied and diverse nature of BMPs and how they are implemented allow for an exploration of different policy options. If it is assumed that policy falls into one of six categories: 1) regulation, 2) taxation and other charges, 3) subsidies, 4) market mechanisms, 5) human rights and 6) voluntary, then it is conceivable to create a BMP research instrument depicting each of these. By first educating the respondent both verbally and visually about BMPs, a *frame of reference* will be created. The idea of framing an approach to environmental problem solving was reviewed by Bardwell (1991). She drew together concepts from cognitive psychology and conflict management to focus upon the process of problem definition. Problem framing refers to “a concerted effort to focus on one’s understanding of a problem” (Bardwell, 1991, p. 607). The framing concepts in this study are defined the following way:

- A frame of reference is an analytical model of values concerning a specific water resource policy or management issue.
- A personal frame of reference refers to the values expressed by an individual.
- A common frame of reference refers to the distinctive pattern of values common to a number of individuals.

Framing the policy choices for BMP implementation was chosen in an effort to control for two of the three boundary conditions that Fishbein and Ajzen (1975; Ajzen & Fishbein, 1977) identified as being able to affect the magnitude of the relationship between attitudes and behavior. Particularly, the use of a frame of reference should increase the degree to which the measure of intention and the behavioral criterion

correspond with respect to their levels of specificity and it can control for the degree to which carrying out the intention is under the volitional control of the individual.

Previous research indicates that the principles at the situational level are not constructed independently from those at the universal level (Ajzen & Fishbein, 1977; Axelrod, 1994). Just how universal and situational fairness criteria change and interact when people are framing their fairness judgments is not yet totally clear. However, it may be that the more urgent the situation and the greater the need for the short-term actions to achieve long-term sustainability, the more that situational fairness may dominate (Nancarrow, Smith, & Syme, 1996-7).

Purpose Statement

The primary purpose of the study is to assess the relationships between the antecedents of knowledge, attitudes, locus of control and sense of responsibility on the intention to support the implementation of watershed best management practices. Also, it will examine the role of individual fairness judgments towards developing watershed policies. Based on these variables, the study population will be categorized and described. Lastly, the study will determine which variables influence the intention to support the implementation of watershed best management practices.

Research Questions

This study addresses the following research questions:

- Q1: What attitudinal groups exist in the community surrounding the implementation of BMPs in the Sycamore Creek watershed?
- Q2: How do the demographic characteristics vary by attitudinal group?
- Q3: What are the “fairness evaluations” regarding the implementation of BMPs for the sample population and for each attitudinal group?

- Q4: What is the relationship between "personal responsibility" and the attitudinal groups?
- Q5: What is the relationship between "knowledge of the issues" and the attitudinal groups?
- Q6: What is the relationship between "knowledge of action strategies" and the attitudinal groups?
- Q7: What is the relationship between "locus of control" and the attitudinal groups?
- Q8: Do the attitudinal groups differ in terms of intention to act?
- Q9: What are the correlations between knowledge, personal responsibility, locus of control and intent to act?
- Q10: Which of the variables of knowledge, attitudes, personal responsibility and locus of control have the greatest influence on one's intention to act? (see Figure 1)

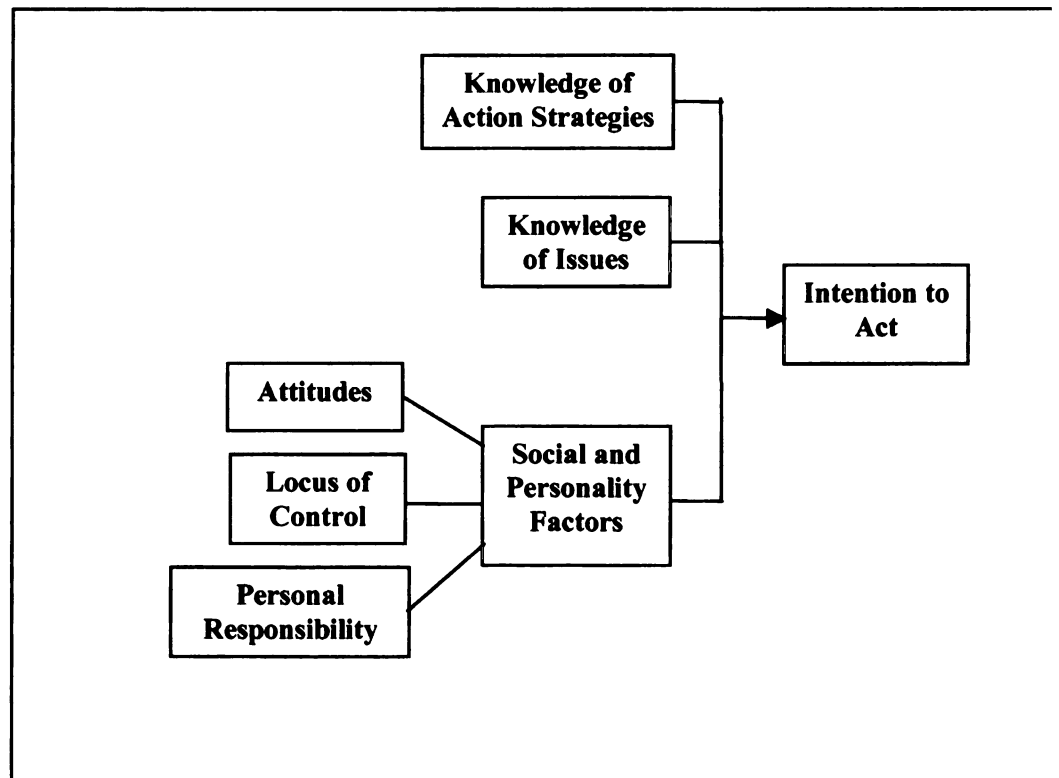


Figure 1: Proposed Model of Responsible Environmental Behavioral Intentions
Based on Hines, Hungerford and Tomera (1986)

Delimitations

The study was delimited to a sample of property owners within the Sycamore Creek watershed, Ingham County, Michigan. The restriction of property ownership further delimited the study to individuals eighteen years old and above possessing the income and desire necessary to own property.

Definitions

The following terms are defined for the purpose of this study. For many of the terms, a more operational explanation is detailed in Chapter III.

Attitude: describes the individual's feelings, pro or con, favorable or unfavorable, with regard to particular aspects of the environment (Hines et al., 1986; Newhouse, 1990). Ajzen & Fishbein (1980) suggested that attitude categories include attitudes towards objects as well as more specific attitudes towards certain issues or attitudes toward taking action.

Best management practices: can be defined as "schedules of activities, prohibitions of practices, maintenance procedures, and structural and/or managerial practices, that when used singly or in combination, prevent or reduce the release of pollutants to waters..." (MRSC, 2000).

Distributive Justice: distribution of outcomes on either an equal or equitable basis (Lind & Tyler, 1988).

Equity: the value that people should receive returns appropriate to their contribution (Lind & Tyler, 1988).

Equality: the value that all people should receive the same return (Lind & Tyler, 1988).

Intention to Act: behavioral intention is indicated by a person's subjective perception and report of the probability that s/he will perform the behavior in question (Parcells, 1984). Intended behavior is used as a substitute for actual behavior, but may not be as an accurate predictor (Hwang, Kim, & Jeng, 2000).

Knowledge: environmental knowledge can be categorized into three levels, (1) knowledge about the issues, (2) knowledge about the action strategies and (3) possessing an action skill (Boerschig & DeYoung, 1993; Hines et al., 1986).

Locus of Control: is a construct that refers to an individual's beliefs about whether the outcomes of his/her actions are dependent on what his/her do (internal control orientation) or are determined by events outside his/her personal control (external control orientation) (Rotter, 1966).

Personal Responsibility: means a personal obligation or sense of duty to implement actions (Boerschig & DeYoung, 1993).

Procedural Justice: procedures consistent with personal values and that show dignity and respect for participants (Lind & Tyler, 1988; Tyler, 1988).

Values: are standards or criteria that guide action as well as other psychological phenomena such as attitudes, judgments and attributions (Rokeach, 1979). Values are considered deeper and more stable than attitudes, representing standards of "oughts and shoulds" and are viewed as determinants of attitudes (Rokeach, 1979, p. 272).

Value Orientations: clusters of interrelated fundamental values (Schwartz, 1992; Stern et al., 1995).

Worldviews: defined as shared beliefs and values that justify different ways of behaving with corresponding cultural biases towards different patterns of social relations (Dake, 1991, 1992).

Organization of Study

The presentation of this research is organized into five chapters. Subsequent to this introductory chapter is a review of the literature germane to the research. The chapter is divided into two main sections. The first section reviews the theoretical underpinnings while the second focuses on specifying the relationships between the model components through a review of previous research. The following topics are discussed in the first section: values and their role in decision-making; value orientations and worldviews; and the development of the fairness heuristic as an attitudinal measure. In section II the topics discussed are: the theories of reasoned action (TRA) and planned behavior (TPB), the behavior – behavioral intention relationship, attitudes, personal responsibility, locus of control, knowledge, the influence of demographic variables and predicting and explaining intentions and behavior using TRA & TPB. The third chapter outlines the steps taken in formulating the survey instrument, how the survey was conducted and the methods used for the analysis. Chapter IV presents the attitudinal factors found in the sample population, it profiles the attitudinal groups who poses similar worldviews, it explores the fairness evaluations towards implementing BMPs, it explores the relationships between each of the study variables and it determines which variables best predict behavioral intentions. Finally, Chapter V contains the discussion and conclusions, the implications of this research to Sycamore Creek watershed managers and recommendations for further research.

CHAPTER II:

REVIEW OF THE LITERATURE

The purpose of this chapter is to review the literature on the theory of environmental decision-making and the antecedents of knowledge, attitudes, locus of control and personal responsibility thought to influence these decisions. Several researchers (Peterson, 1994; Rasinski, 1987; Syme et al., 1999) have hypothesized that fairness evaluations mediate the relationship between these antecedents and the intention to act environmentally responsible. Therefore, this chapter also reviews the literature on procedural and distributive justice in environmental decision-making and is divided into two main sections. Part I reviews the psychological theory on which the research is based and is broken down into five sections: (1) values, (2) the role of values in decision-making, (3) value orientations, (4) value orientations and the social construction of worldviews, (5) the evolution of the fairness heuristic as an attitudinal measure and (6) basic categories of environmental policy and implied justice considerations. Part II reviews previous research employing the same study variables so that a better understanding of the relationships between the model variables can be understood. Part II is divided into eight sections: (1) the theories of reasoned action (TRA) and planned behavior (TPB), (2) the behavioral intention – behavior relationship, (3) attitudes, (4) personal responsibility, (5) locus of control, (6) knowledge, (7) demographic variables and (8) predicting and explaining intentions and behavior using TRA & TPB. The chapter concludes with a summary.

PART I

Values

Although even a cursory review of the literature on human values yields a large number of definitions there are five features that are common to most of the value definitions (Maslow, 1959; Rokeach, 1973; Schwartz & Bilsky, 1987). According to the literature, values are (a) concepts or beliefs, (b) about desired end states or behaviors, (c) transcend specific situations, (d) guide selection or evaluation of behavior and events and (e) are ordered by relative importance (Schwartz, 1992). Values, as defined by Rokeach (1979), are standards or criteria that guide action as well as other psychological phenomena such as attitudes, judgments and attributions. Values are considered deeper and more stable than attitudes, representing standards of "oughts and shoulds" (Rokeach, 1979, p. 272) and are viewed as determinants of attitudes. Schwartz (1992) added "the primary content aspect of a value is the type of goal or motivational concern that it expresses" (Rokeach, 1979, p. 4). Some examples include efficiency and practicality, achievement and success, democracy, freedom, and equity, to name a few. These definitions and examples suggest that the values people embrace are responsible for guiding their pursuits in life.

Theory suggests that an individual's view of the environment in which he or she lives can be organized into a hierarchy consisting of values, value orientations (i.e., patterns of basic beliefs), attitudes/norms, behavioral intentions and behaviors (Ball-Rokeach, Rokeach, & Grube, 1984; Fulton, Manfred, & Lipscomb, 1996; Homer & Kahle, 1988; Rokeach, 1973; Rokeach, 1979). Each of these elements build upon one another in what has been described as an inverted pyramid (Figure 2).

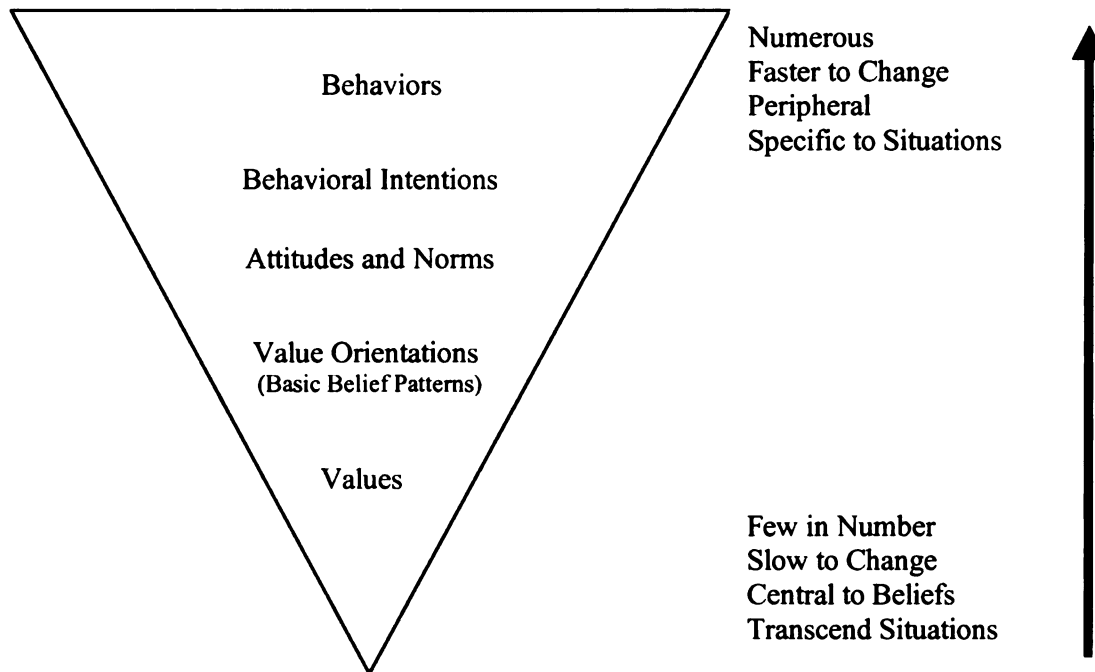


Figure 2: The Cognitive Hierarchy

Source: Fulton et al., 1996

Values tend to be widely shared by all members of a culture and as such are unlikely to account for much of the variability in specific attitudes and behaviors. Rather, values are reflected in attitudes via beliefs, value orientations and attitudes. For example, basic beliefs serve to strengthen and give meaning to fundamental values and visa versa. Patterns of these basic beliefs create value orientations (Fulton et al., 1996).

The Role of Values in Public Decision-Making

Relatively little is known about how people make political decisions under the stress of conflict. However, three possible explanations can be found in the literature to explain the apparent value conflict frequently encountered in decision-making. The first explanation gives personal values a central role in reasoning about behavioral intentions

(value-driven models). An example is Tetlock's (1986) value pluralism model of ideological reasoning that argues people reason in increasingly integrative complex ways about an issue to the extent it invokes values that are both highly and equally cherished. The second hypothesis is that personal values are mediated and therefore given a secondary role. The example here is Lind's (1992) fairness heuristic model that argues an assessment of 'fairness' mediates the relationship between values and support for policy positions. The third set of explanations is the affect hypotheses that do not allow any role for personal values in reasoning on highly emotional issues. These theories (Jackman, 1978; Schuman et al., 1985; Sears and Kinder, 1971) argue that people take positions based on affect, not cognition like values. Let us look closer at each of these theories.

The Value Pluralism Approach

The value pluralism approach to explaining value conflict that may result in cognitive dissonance (Festinger, 1962) is as follows: policy analysts frequently argue that efforts to achieve one objective (e.g. equality) often require sacrificing or seriously compromising other important objectives (e.g. merit). For example, policies designed to manage natural resources often have the unwanted side effect of decreasing personal income. And policies designed to increase economic growth and efficiency often exacerbate income inequalities. In brief, making public policy choices requires making value tradeoffs (Sniderman, Brody, & Kuklinski, 1991; Sniderman & Tetlock, 1986b; Tetlock, 1986). To support a particular policy means trading fulfillment of one cherished value for another. For example, Tetlock (1986) found that when subjects ranked 'equality' higher than 'a comfortable life' as a personal value this was highly correlated ($r = .61$) with whether the subjects supported paying higher taxes to assist the poor.

Subjects believed that to achieve equality for the poor meant forfeiting personal income vis-à-vis higher taxes. Feather (1979) also found a significant correlation between value rankings and public policy choices. Using the Rokeach (1979) value survey, he found that subjects who supported politically conservative policies also supported particular values (e.g., national security, cleanliness, obedience and salvation) over others (e.g., equality, freedom, love and pleasure). Value differences therefore underlie policy choices.

In an effort to explain when people will acknowledge that important values are indeed in conflict, Telock (1986) proposed a value pluralism model of ideological reasoning. The model can be summarized in the three following propositions. First, all ideologies have underlying core or terminal values (Lane, 1973; Rokeach, 1973, 1979) that direct people's public policy preferences by specifying what the goals ought to be of the public policy. Second, people differ in the degree to which they acknowledge their core values are in conflict with one another. People with monistic ideologies believe their values all point in one policy direction while people with pluralistic ideologies acknowledge their core values sometimes point in conflicting directions. And thirdly, people with more pluralistic ideologies display more integrative or "trade-off" reasoning than those with monistic ideologies (Peterson, 1994). In short, value pluralism is increased to the extent that core values are both more highly and equally prized, thus setting the frame for decision-making (Bamberg, Kuhnel, & Schmidt, 1999).

Values are Mediated - The Fairness Heuristic

Lind et al., (1995) argue that people use subjective assessments of fairness, an organizing principle that is derived in part from personal values (Rasinski, 1987), as an

organizing schema in social and organizational decision-making. In particular, they hypothesized the operation of a 'fairness heuristic' which suggests people form impressions of the general fairness of an organization, authority or policy and use that as a major criterion for support or opposition to the policy (Lind, 1992). People assess fairness when encountering a new situation because they are suspicious of the intent or result of a policy. Questions like "Do programs designed to improve a situation really help the people whom they were intended to assist?" are often asked. Fairness here is a judgment. The judgment is defined as what "is" rather than what "ought to be" as a value judgment.

In the initial assessment stage, people are highly attuned to cues about a policy's fairness including the assessment of how well a procedure shows respect and dignity for the participants (Lind & Tyler, 1988; Tyler & Lind, 1992) and if it is congruent with ones' own personal values (Rasinski, 1987). Procedures that are consistent with personal values and show dignity and respect for participants are considered fair and are likely to be supported. Policies inconsistent with personal values and not showing dignity and respect for those involved are likely to be opposed. Once an impression of fairness is produced, it becomes extremely resistant to change because it provides a cognitively available summary judgment (Peterson, 1994). People use their summary fairness judgment in lieu of a more complicated policy analysis each time they are asked. Therefore, the fairness heuristic posits that values play a role in developing policy positions, if only a secondary one.

Both correlation and experimental evidence have supported the fairness heuristic hypothesis. In a study assessing litigant reactions involving arbitration in Federal Court

cases, Lind et al. (1995) found that decisions of whether to accept or reject an arbitrator's award was most strongly related to people's procedural justice judgments. Results revealed that judgments of procedural fairness mediated the effects of outcome evaluations. People who thought the process was fair were more likely to accept the mediation award, regardless of the outcome (Lind and Tyler, 1988; Tyler and Lind, 1992). Procedural justice judgments were better predictors of acceptance of a mediation award than either subjective or objective measures of the award itself (Lind and Tyler, 1988; Tyler and Lind, 1992). Finally, results showed that use of the fairness heuristic was not limited to individuals; corporate decision makers (some of the litigants represented corporations as well) similarly indicated the use of a fairness heuristic.

In another field study of court-annexed arbitration hearings in New Jersey State Courts, (MacCoun, Lind, Hensler, Bryant, & Ebener, 1988) found similar results. Participants' assessments of fairness were strongly related to their perceptions of procedural fairness (i.e. neutrality of the arbitrator and a process that grants full status to those involved). Again, respondents who rated the process they experienced as more fair also were more likely to accept awards of the arbiter and were more satisfied with the final outcome of their case than those who rated their experiences as fair.

Affect Explanations - No Role for Values

The insincerity and minimalism theories are both affect explanations for the role of values in decision-making. These two theories posit a strikingly different role for values in people's support (or lack thereof) for public policy. In particular, researchers (Jackman, 1978; Schumann, Stech, & Bobo, 1985; Sears & Kinder, 1971; Sidanius & Pratto, 1993) have noted the paradox between support for racial equality in principle and

opposition to government programs such as affirmative action to achieve those ends. Such 'slippage' between espoused values and public policy preferences is known as the "principle-policy puzzle" (Sniderman & Tetlock, 1986a) and is a common finding in surveys of political issues. In several arenas people's policy preferences are out of step with at least one of their expressed values. Affect theorists argue that people's espoused values are often inconsistent with policy preferences because policy preferences are dictated by deep-seated, self-centered feelings and not rational thought (Peterson, 1994).

Proponents of the insincerity theory (Jackman, 1978) argue that regardless of what they say, people are not committed to the liberal values they advocate. It is argued that many Americans, particularly those well educated and most likely to purport liberal values, provide lip service to egalitarian values because those values are socially desirable when in fact, they support traditional, self-interest driven public policies. McConahay (1986) goes so far as to say that those who support traditional or conservative policies are using that as a cover for racist values. This line of argument usually reduces to an impression management explanation where people furnish egalitarian responses to value questions primarily to impress others.

Alternatively, the minimalist argument theorize there are only loose linkages between values and policy positions which create inconsistency between values and policy positions (Converse, 1964). People have only a very hazy notion of how their values should translate into their support/opposition of policy. As a result, where strong affect is aroused, it can overwhelm the role of personal values and dominate policy preferences. Again using the example of affirmative action, many white Americans experience discomfort in the presence of African Americans (Crosby, Bromley, & Saxe,

1980; Katz, 1976). Therefore, when reasoning about race issues if someone feels favorable towards African Americans, they favor affirmative action, but because many whites are uncomfortable around African Americans they would oppose affirmative action.

The insincerity and minimalism theories have quite different implications for understanding attitudes about policy support. Belief in minimalism leads one to the conclusion that people need to be educated about the implications of the values they hold. Specifically in the case of affirmative action, it would lead in the direction of clarifying the implications of the egalitarian values to the mass public. Conversely, the insincerity hypothesis contends that education is a primary cause of the paradox of simultaneously supporting egalitarian values and opposing affirmative action. White, Anglo-Saxon public policy preferences are really driven by a desire to retain a privileged position in society (Sidanius and Pratto, 1993). Unfortunately, it is quite difficult to distinguish whether people are engaging in impression management or in intra-psychic conflict because in most situations they are empirically indistinguishable (Peterson, 1994). Empirical support for one of these theories can be interpreted as support for the other as well.

The structure of human values is inherently interesting to many researchers (Bazerman, Messick, Tenbrunsel, & Wade - Benzoni, 1997; Feather, 1979; Rasinski, 1987). Schwartz and Bilsky (1987) see three main benefits to focusing on values for research purposes. First, the impacts of values as independent variables on both attitudes and behaviors can be predicted, identified and interpreted more effectively and reliably by using indices of the value orientations as opposed to single values (Ajzen & Fishbein,

1980; Rokeach, 1979; Schwartz & Bilsky, 1987). Second, the effects of social structural variables (i.e. economic, political, religious, ethnic) on values as dependent variables can be predicted, identified and interpreted more effectively by using value orientations as opposed to single values (Ajzen & Fishbein, 1980; Rokeach, 1979; Schwartz & Bilsky, 1987). And lastly, cross-cultural studies seem to indicate that comparisons of value importance are more comprehensive if value orientations are used because the orientations will ideally cover all the significant types of value content whose meanings are shared, whereas research not guided by a concept of value structure must rely on single values arbitrarily chosen by the researcher (Ajzen & Fishbein, 1980; Rokeach, 1979; Schwartz & Bilsky, 1987).

Value Orientations

Much of what has been written about incorporating values into environmental management decision-making comes from the literature on economics. Contingent valuation (CV) and its variants have strived since the early 1980's to capture how people value environmental goods and attach dollar amounts to these values. The prevailing practice is to take maximum willingness to pay (WTP) as the measure of the value of a good for an individual. This *purchase model* is the theoretical foundation for the CV method and the value of a public good to the public is estimated by surveys in which respondents state their willingness to pay for the good (Bazerman et al., 1997; Carson, Louviere, & Anderson, 1994). This first value orientation relies on the tenants of economic equity (Walster, Walster, & Berscheid, 1978) and utility theory (Bazerman et al., 1997) and refers primarily to goals such as economic security or achievement, material rewards and/or avoidance of economic, material or time costs. It parallels the

sustenance needs identified by Schwartz and Bilsky (1987) and Maslow (1959), although it more accurately reflects the value placed on economic and material desires regardless of one's actual need situation (Bazerman et al., 1997). This is an important distinction because the pursuit of economic gain appears to motivate behavior well beyond a time when physical needs are met (Bazerman et al., 1997).

Discrepancies between peoples willingness to accept payment and willingness to pay for a public good (Bazerman et al., 1997), the high incidence of protest bids (Jorgensen & Syme, 2000) and the possibility that people view payments as contributions towards preservation (Bazerman et al., 1997) have all been cited as arguments that the contingent valuation method fails to capture the complexities surrounding how people value the environment. Consequently, it can be surmised that economic valuation is only one value orientation people use when making environmental decisions. Stern et al. (1993) propose two other value orientations besides economic: (a) social requirements and (b) universal.

The second value orientation represents the social aspects of life. It specifies desires regarding social consequences from one's actions and includes both belongingness and conformity drivers as well as aspects of social altruism (Schwartz & Bilsky, 1987) and benevolence (Schwartz, 1992) motives. It postulates that the motivation to seek belongingness and acceptance from others is a central guiding force in decisions to act (Axelrod, 1994). Virtually all discussions on value theories have at least one domain that involves social needs (Axelrod, 1994). It is assumed that conformity and belongingness values, as well as part of the benevolent values, are rooted in relationship needs and desires. Thus actions in accordance with these desires would, theoretically,

lead people to pursue goals such as the welfare of others (especially those close to you) as one means of maintaining and/or enhancing one's feelings of connection with others.

Social values and desires are frequently noted in discussions of environmental behavior. For instance, the desire for belongingness can induce people to act in a manner consistent with valued others and the value placed on benevolence may prompt socially-oriented people (people who place social values at the top of their hierarchy) to act environmentally protective when they believe their actions can help minimize the plight of other people (Axelrod, 1994). In addition, the social value orientation can be seen as consistent with the cooperative orientation identified by Messick and McClintock (1968), although a cooperative orientation may also overlap with the universal value domain. Numerous studies have shown that players involved in experimental game paradigms who have a cooperative orientation pursue outcomes that maximize gains for all players and not just for themselves (Kramer, McClintock, & Messick, 1986).

The third motivational orientation, universal, is the most consistent with Schwartz's (1992) universalism domain. The motivational content of this value type involves the pursuit of self-respect garnered from making a contribution to the betterment of the world, especially as it pertains to pursuing and attaining outcomes that correspond with universal-type goals (e.g., equity, environmental preservation). Pursuing these goals may in fact involve certain social or economic costs, which universally-oriented individuals are willing to incur (Axelrod, 1994). For example, protesting the harvesting of a section of forest may mean a loss of jobs and have no perceived social benefits, but people may do it in response to their desire to improve environmental conditions - an outcome consistent with a desire to act in a universalistic manner. This motivational

domain is most strongly reflected in those people willing to violate laws and court injunctions and risk substantial fines in order to achieve a certain goal.

A cautionary consideration regarding the construction of this value taxonomy should be noted. Although each domain is presumed to be an independent source of motivation, overlapping values among the domains may occur. To illustrate, universal goals may involve pursuing outcomes such as social justice - a goal that blurs the line between the social and universal orientations. This confusion can be addressed by recalling the basic motivations associated with each domain. People with a social orientation are most concerned with maintaining and enhancing connections with others. When applied to social issues, this goal is considered consistent with pursuing outcomes that are believed to benefit a majority of people. People adhering to a universal value domain embrace a contributory ethic - one which emphasizes the pursuit of a personal conception of universal goals.

Value Orientations and the Social Construction of Worldviews

The literature on the social construction of risk can lend insight on the nexus between value orientations and worldviews. Douglas (1975) and her colleagues argue that conflicts over risk are best understood in terms of plural social constructions of meaning. Competing cultures confer different meanings on situations, events, objects and especially relationships. Their assertion is that risk perception is everywhere and always biased by legitimized social groupings in the form of institutions embodied in everyday, ordinary social interactions with family, friends and colleagues (Douglas, 1990; Douglas, 1986; Douglas, 1985; Douglas & Wildavsky, 1982a; Douglas, 1982b; Schwartz & Thompson, 1990). Indeed, this is true for more than just risk situations and the same

reasoning can be extended to most decision-making circumstances. Their reasoning provides a useful explanation for people's decision-making reasoning and therefore can provide a construct for understanding them, especially as it pertains to value orientations.

In making the claim that risk perceptions are socially constructed, Douglas (1975), Dake (1992) and others propose a functional explanation why risk taking and risk ignoring are products of the various involvements that individuals have in their social life (Thompson, Ellis, & Wildavsky, 1990). Thus, cultural theory is a functional interpretation of the myths of nature because risk is explained in terms of the contribution a person's perceptions have for maintaining a particular way of life (Dake, 1992). Cultural theory accounts for the social construction of the environment in terms of three linked domains that constitute a way of life: cultural biases, social relations and behavioral strategies. Worldviews are defined as shared beliefs and values that justify different ways of behaving with corresponding cultural biases towards different patterns of social relations (Dake, 1991, 1992). When environmentalists blame the system for environmental damage or when corporations proclaim a cornucopia view of nature and call for market controls (e.g., carbon taxes) or when bureaucratic organizations call for a top-down management of technological hazards, these behaviors are functional because they justify and maintain the pattern of social relations from which they arise (Dake, 1992; Thompson et al., 1990, p.104).

The social construction approach hypothesizes that identity is mediated by an individual's relationship to others (i.e., social and universal value orientations). Individuals who identify with collectives that make decisions binding on all members "will see themselves very differently than those who have weaker ties with others and

therefore tend to make decisions that only bind themselves" (Schwartz & Thompson, 1990, p.6). Cultural theory also maintains that identity is shaped by a second factor, namely the extent that social prescriptions constrain a person's behavior (Dake, 1992). According to this 'grid/group' nomenclature, as cultural theory is sometimes called, social prescriptions (the grid dimensions) and group identity (the group dimension) give rise to distinctive myths of nature and specific types of rationality. This taxonomy elegantly captures the value domains previously described and orders them into a manageable number of ways of life. Specifically, decision-making strategies and how people manage themselves are reduced to five basic patterns of life: hierarchical, individualist, egalitarian, fatalist and autonomous (Rayner, 1986; Thompson, 1988; Thompson & James, 1989; Wynne, 1989). These relational forms, together with the cultural biases that justify them, are each hypothesized to engender shared representations of what does and does not constitute a management perspective (Douglas, 1975). Put another way, "adherence to a certain pattern of social relationships generates a distinctive way of looking at the world; adherence to a certain worldview legitimizes a corresponding type of social relations" (Thompson et al., 1990, p.1). Among all possible choices, those selected for consideration or dismissal serve (often intentionally) to strengthen one of these cultures and weaken the others.

Hierarchically arranged groups are those stemming from high levels of stratified prescriptions (high grid) and strong group boundaries (high group) are hypothesized to foster the myth that nature is 'perverse or tolerant' (Dake, 1991). This myth holds nature to be robust, but only up to a point. Sustainable development is the rational environmental strategy in a hierarchical culture because this policy takes advantage of the

perceived resilience of nature, but respects the known limits (UNESCO, 1991). In this worldview, the limits of the ecosystem and hence appropriate resource conservation and development strategies, can only be proposed by certified decision makers or experts. The analogy here is that resource management is like a traditional family life where compliance to regulations is supposed to flow up the ranks of long-lasting institutions just as commands flow down (Dake, 1992).

Egalitarian groups are those with strong ingroup/outgroup boundaries (high group) but with prescriptions that do not vary by rank and station (low grid) and believe the myth that nature is 'fragile' (Dake, 1991). Just as the experts-know-best approach to resource management justifies hierarchical social relations, so the egalitarian view that nature is ephemeral justifies the precautionary approach to management. Egalitarian groups are critical of the procedural rationality associated with hierarchy because they prefer approaches to management policies that foster equality of outcomes (Rayner, 1988b). Egalitarians are hypothesized to frame natural resource issues in ethical terms because this allows them to focus on the social and political dimensions and to criticize the institutions responsible for natural resource management (Dake, 1992). In its extreme form, egalitarianism calls for strict preservation of the environment (Wildavsky, 1991).

The collective community that unites both the hierarchical and egalitarian defense and protection of the environment is the antithesis of the arguments put forth when individualist forms of social relations prevail. Individualists are hypothesized to hold the myth of nature as benign, so that if people are released from artificial constraints (regulation and enforcement) there will be few limits to the abundance for all and this will more than compensate for any hazards created in the process. Deregulation is the

rational management strategy in low-grid/low-group cultures because individualists value decisions stemming from personal judgment rather than collective control (Rayner, 1988a). The term individuals in this context are social beings generating and stabilizing a form of social relations and institutions that defend their freedom to bid and bargain in self-regulated networks with few prescriptions (Thompson, 1992).

Cultures of fatalism are those with high levels of prescription and with minimal collective participation and are hypothesized to hold the myth of nature as capricious. Fatalists may be those who have been excluded from the other ways of organizing social life; those who cannot compete successfully in markets, who cannot meet the minimum social standards of bounded and stratified groups and who cannot assemble the time, energy or resources required for political participation (Thompson et al., 1990). Equally plausible, fatalists may be those who simply want to be free from the disempowerment of influence from well-wishers (Dake, 1992). Either way, fatalists are hypothesized to construct a cultural bias that rationalizes isolation and resignation to stringent controls on their behavior (Mars, 1982). “Why bother?” is the rational for resource management strategies in this high-grid/low-group culture. Fatalists are thought to view life as a lottery in which no particular management strategy is best. Theirs’ is a capricious world, where they desire to be left alone and stay out of harms way.

The fifth cultural pattern is autonomy - a largely asocial way of life and is not relevant to this research. Table 1 presents the four relevant worldviews.

The literature on risk and cultural theory have empirical findings that are useful in understanding natural resource management decision-making. One finding is that those who hold an egalitarian bias (who value equity and lessen the distinctions between

Table 1: Grid/Group Nomenclature and Worldviews

		Social Prescriptions	
Group Identity		High Grid	Low Grid
	High Group	Hierarchical Nature is Tolerant	Egalitarian Nature is Fragile
	Low Group	Fatalists Nature is Capricious	Individualist Nature is Benign

Source: Dake 1992

people based on wealth, race, gender, authority, etc.), have been found to perceive the dangers associated with most technologies as great, and their attendant benefits as small (Dake, 1992). Among the largest empirical correlates of egalitarianism are concerns about environmental pollution, the dangers associated with nuclear energy and the threat of nuclear war (Dake, 1992). To clarify, it is not that cultural theory conceives that individualistic or hierarchical oriented people do not perceive environmental concerns or risks, just that they disagree with egalitarians about how these concerns should be ranked. For example, hierarchically oriented people correlate higher with concerns about the loss of respect for authority and other forms of insubordination, while individualism is more highly correlated with economic issues such as lack of a stable investment climate. Furthermore, this research on worldviews replicated previous findings that measures of a person's worldviews are related to traditionally assessed personality traits and personal values as well as to social attitudes and policy preferences (Buss, Craik, & Dake, 1985; Buss, Craik, & Dake, 1986). For instance, in a California sample, hierarchy was related to a cautious, moderate, unassuming personality style and to a highly conservative political orientation. Conversely, egalitarianism was associated with a less inhibited, more expressive and assertive way of behaving and with a more liberal political orientation (Dake, 1991).

The Evolution of the Fairness Heuristic as an Attitudinal Measure

Some research suggests worldviews regarding natural resources become clearer when viewed through the lens of environmental ethics, (Wenz, 1988) and procedural and distributive justice (Syme & Nancarrow, 1997a; Syme & Nancarrow, 1997b; Syme et al., 1999). General worldviews become elevated to the level of an attitude when they focus on a specific attitudinal object and are viewed through the lenses of ethics and justice (Peterson, 1994; Syme et al., 1999). It has been shown that attitudes provide a much better predictor of behavior than values (Ajzen & Fishbein, 1980; Vaske & Donnelly, 1999) and in an effort understand the fairness heuristic it is necessary to explore the principles it is founded on.

Environmental ethics have received considerable academic attention, particularly in the discipline of philosophy. Ethics can be defined as the “study or discipline which concerns itself with judgments of approval and disapproval, the rightness or wrongness, goodness or badness, virtue or vice, desirability or wisdom of actions, disposition, ends, objects, or states of affairs” (Runes, 1983, p.113). Environmental ethics deal more specifically with human conduct towards the natural environment. It is inevitable that humans interact with the natural environment. But “What ideas govern or structure this interaction?” and “What is the appropriate relationship between humans and nature?” For purposes of this study, environmental ethics are defined as the diversity of ideas driving human relationships with the natural environment (Wenz, 1988). Examples include stewardship of nature as a religious duty and the intrinsic rights of nature. As used in this study, environmental ethics are more focused constructs than values as they apply to human-environmental relationships generally rather than on specific natural objects. There is a rich literature in history, philosophy and other environmentally related

fields of study regarding environmental ethics. Much of this literature is reviewed in contemporary texts and this study relies on Wenz's "Environmental Justice" (Wenz, 1988) for structuring the attitudinal independent variable.

Justice is a value judgment about the moral rightness of a person's fate (Furby, 1986). Treatment by other people or non-human forces (i.e. policies) is judged to be just if it meets the appropriate standards of what is morally correct. These standards are defined by supportive values. Justice supporting values differ within and across persons and context (Seligman, Syme, & Gilchrist, 1994) and are learned from cultural relations (Dake, 1992; Fiske & Taylor, 1990). Equity, the value that people should receive returns appropriate to their contribution and equality, the value that all people should receive the same return are two values that have received extensive research attention and indeed provided the foundation for the early research in water allocation. The value of fair procedures has also received a share of research attention (e.g. Lind and Tyler, 1988).

The literature on equity theory and research provides four key propositions about social behavior that are reflected in the fairness heuristic. They are:

Proposition I: Individuals will try to maximize their outcomes. The corollary to this is that if individuals perceive they can maximize their outcomes by behaving equitably, they will do so. Should they perceive they can maximize their outcomes by behaving inequitably, they will do so.

Proposition II: Groups can maximize collective rewards by evolving accepted systems for equitably apportioning resources (or costs) among members. Furthermore, groups will generally reward members who treat others equitably and generally punish (increase the costs for) members who treat others inequitably.

Proposition III: When individuals find themselves participating in inequitable relationships, they become distressed. The more inequitable the relationships, the more distressed individuals feel.

Proposition IV: Individuals who discover they are in an inequitable relationship will attempt to eliminate their distress by restoring equity. The greater the inequity that exists, the more distress they feel and the harder they will try to restore equity.

(Source: Walster et al., 1978)

Imbedded in the fairness heuristic questions are these four propositions. The intention is to elicit from the public how they feel equitable policies can be formulated while causing the least amount of distress.

It seems appropriate at this point to review the history of ethics and justice considerations as they have been applied to water management. Initially in the area of water allocation, Pierce (1979) attempted to relate people's central values to their priorities for water allocation for the environment. This author found that adherence to Rokeach's (1973) value of a 'world of beauty' resulted in a higher priority for water for environmental preservation. Conversely, support for a 'comfortable life' tended to be negatively associated with priorities for allocations for conservation. The relationships were modest however, and the values very general and perhaps too broad for an evaluation of specific allocation systems (Syme & Nancarrow, 1997a). Nevertheless, Pierce (1979) demonstrated that it was possible to empirically assess community values and their relationship to priorities for water allocation.

In an initial attempt to apply more specific equity and procedural justice constructs to water allocation issues, Syme and Fenton (1993a) addressed community perceptions of equity and procedural justice in the context of groundwater allocation in Australia. The allocation issue included environmental as well as human uses. As an initial step, they attempted to replicate the measurement of Rasinski's (1987) proportionality and egalitarianism equity factors derived in the context of social welfare

policy. They then attempted to relate these to preferred allocation structures derived from Thibaut and Walker's (1975) early work on procedural justice.

The results showed that Rasinski's (1987) general community factor of egalitarianism was able to be replicated and was strongly supported by the community sample. The concept of proportionality (or allocation based on returns appropriate to people's contribution) was less well defined and supported.

Syme and Fenton's (1993a) work was successful in extrapolating some of the existing equity and justice theories in water allocation, but it was evident that the questions were too general to accurately reflect participants' views and therefore limited in its predictive ability. There was also a need for more precise questioning in the context of specific decision-making systems (Syme & Nancarrow, 1997a) than simply value orientations.

Recall that Lind and Tyler's (1988) results revealed that judgments of procedural fairness mediated the effects of outcome evaluations. Syme and Fenton's (1993) results would seem to support this finding and indeed concluded that while justice considerations provided some insights in relation to water allocation, they were far from sufficient for explaining the ethic or culture towards water management planning. Research in other disciplines has shown that quite sophisticated lay theories operate in a variety of domains, such as economics and education (Furnham, 1988). Similarly, a range of philosophies and values may exist which influence attitudes towards the allocation of natural resources, for example the notion that nature is fragile (Bengston, 1994).

The purpose of Syme et al.'s (1999) work in allocation was to establish the relationship, if any, between expectations of the planning process and perceptions of

ethics and equity as well as what philosophical questions the lay public were comfortable with (Syme & Nancarrow, 1992). Due to the failure to adequately capture the proportionality construct in the previously mentioned study, the philosophical questions posed to stakeholders were widened. This approach was warranted not only because the data seemed to indicate this need, but also because post survey interviews from the first study also suggested that two dimensions did not adequately represent the variety of opinions on how to allocate water. Therefore, a wide variety of philosophical statements (initially 111) were posed to stakeholders to try and better capture how people thought about water allocation. These pertained to egalitarianism and proportionality from the first study and statements derived from Wenz's (1988) work "Environmental Justice". While some philosophies were harder to express in simple statements than others, the philosophies addressed included:

- Virtue Theory
- Water as a Common Good
- Water as an Economic Good
- Free Market Philosophy: Libertarianism
- Efficiency Principles
- Human Rights (Kant's Categorical Imperative, Positive Human Rights)
- Animal & Environmental Rights
- Utilitarianism as Hedonism
- Distributive Justice
- Certainty and Forecasting
- Cost Benefit (Willingness to Pay)
- Cost Benefit (Kaldor/Hicks Formulation)
- Procedural Justice (Rawls)
- Hare's Cost Benefit Philosophy
- Singer's Philosophy of Animal Rights

Over subsequent studies in a variety of water allocation scenarios with a range of stakeholders, the number of statements was reduced to a manageable 25 to 30 assertions reflecting the ways people think about water management (Syme et al., 1999). The

fairness heuristic recognizes that separating procedural justice aspects of decision-making from those associated with the outcome and even subjective feelings of enjoyment from participation are quite difficult (Folger, 1996). Therefore, this version of the fairness heuristic reflects a better range of philosophical principles about water management that incorporates both procedural and moral concerns as well as those matters associated with outcomes of distributive justice. As a result of these six studies, Syme and his fellow researchers (1999) confidently say the following:

- Large portions of people believe in the ‘rights of the environment’ and its preservation for the range of uses for future generations;
- Fair decision-making processes are of paramount importance to community acceptance of water allocation decisions;
- Water markets alone are not considered fair or acceptable processes for allocating or re-locating water;
- Economic arguments are of lesser importance to process considerations when deciding how water should be allocated or re-allocated; and
- Efficiency of use is a major determinant of fairness of water allocation systems.

Basic Categories of Environmental Policy and Implied Justice Concerns

The justice challenge is to create policies that relate the benefits gained by polluting activities to the disadvantages or risks caused by them. One basic principle in ecological justice could be: equal proportions of benefits and costs from abuse of the common resources (Montada & Kals, 2000). This principle is certainly violated in cases of environmental racism, but more generally by every externalization of costs caused by pollution.

Environmental costs are notoriously externalized, which means that others, not those who cause them, bear the environmental damages and their costs: single citizens

within the community, the community as a whole, the state and other political jurisdictions (Montada & Kals, 2000). Externalized costs pose a serious justice problem. Those who cause the costs receive benefits without being charged with the costs.

Inter-jurisdictional justice problems are raised when costs cross jurisdictional borders. Legal liability norms are a means to re-internalize externalized costs. Consequently, inter-jurisdictional liability norms are needed. However, application of these norms can be problematic as long as the cause of the damage is hard to validly identify. Furthermore, the amount and valuation of damage frequently remains open to question.

There are six basic categories of environmental policy: (1) legal regulations, (2) regulation by tax, (3) subsidies, (4) pollution trading, (5) the establishment of human rights and (6) appeals to responsible actors. Legal regulations aimed at the reduction of damages and risks, if strictly applied, are an effective means of environmental protection. At the same time they may reduce injustices in the distribution of costs and risk within and between groups (Montada & Kals, 2000; Tenbrunsel, Wade-Benzoni, Messick, & Bazerman, 1997). Since they are generally considered valid by society, they guarantee more equity (Montada & Kals, 2000). However, they also have costs and there may be losers (e.g. corporations that go bankrupt). One-sided strict jurisdictional anti-pollution norms may interfere with inter-jurisdictional competitiveness of industries. Moreover, they can lead to restrictions of civil rights, which are only justifiable as a means to prevent dangerous risks or gross injustices (Montada & Kals, 2000). A simple example of the restriction of individual civil rights occurs when in efforts to protect water resources municipalities dictate to residents where they may and may not walk their pets.

Regulations by taxes and other charges, which are revenues for communities and the state, make production and consumption of goods that create pollution more expensive. This is the application of the 'polluter pays principle'. Taxes and charges are meant to reduce the injustices of the associated benefits and costs. States or community revenues could be used for compensation of unjust ecological disadvantages as well as for preventative aims, such as subsidizing eco-friendly technologies or traffic systems, etc. (Tenbrunsel et al., 1997). Still, taxes and charges do not solve every justice problem. Those who have the resources are often able to afford the higher taxes as in the case of gasoline. A sharp rise in taxes may mean economic ruin for corporations as well as private households.

The subsidizing of eco-friendly alternatives for production, traffic, air conditioning and consumption is the third policy instrument. This supply-oriented policy is desirable because it does not restrict freedom rights, but it is negatively evaluated because it allocates costs to the community instead of those who have caused the damages and risks. Therefore, a combination of the first three policy instruments may be most effective and might at the same time prevent economic hazards (Montada & Kals, 2000).

Another market-oriented policy is the allocation of emission rights. An example is the Clean Air Act 1990 that allows corporations a specific amount of risky emissions. The EPA is strongly promoting the use of effluent trading to achieve water quality objectives and standards (USEPA, 1996). Essential to this concept is the definition of emission rights as valuable and tradable goods (Montada & Kals, 2000). These types of policies may have a limiting as well as incentive functions to avoid emissions.

Unfortunately, the just allocation of emission rights is problematic. What will be the basis for allocation? Will it be the reduced emission rate through the use of best available technologies? or the mean emission rights for a particular business sector? or the number of employees within a corporation? or perhaps something else? The questions are endless as the problem becomes more complex if allocations are required between business sectors, generations and/or jurisdictions.

The allocation of legal or constitutional rights to the natural environment might be a powerful measure to correct and prevent ecological damages and unjust distributions (Syme & Nancarrow, 1992; Syme & Nancarrow, 1997b) but it would also cause some problems. One is that the various constitutional rights are not consistent but partly conflict with each other. Ecological rights may interfere with freedom rights, with property rights or with the right to free gainful economic activities (Montada & Kals, 2000). Every newly established right such as the right to a safe ecology may restrict already established rights. Therefore, allocation of ecological rights does not provide consensual solutions. Rather, they legitimize claims that for the present may come into conflict not only with self-interests of other people, but also with their constitutional or legal rights.

The last environmental policy category is appeals to responsible actors. This is probably the most common environmental policy in watershed planning at the present time. Appeals do not restrict freedom rights but neither do they prevent unjust distribution of benefits and costs. The segmentation of the community that complies with the appeals carries the burden and even contributes to the benefits of free-riding segments that do not comply (Montada & Kals, 2000). Therefore, those actors who are principally

willing to comply may feel unjustly disadvantaged in comparison to the free-riders and are demotivated when they become aware of the facts.

PART II

The Theories of Reasoned Action (TRA) and Planned Behavior (TPB)

The theory of reasoned action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) posits that behavioral intentions, which are immediate antecedents to behavior, are a function of salient information or beliefs about the likelihood that performing a particular behavior will lead to a specific outcome (Madden, Scholder Ellen, & Ajzen, 1992). Fishbein and Ajzen (1975) divide the beliefs antecedent of behavioral intentions into two conceptually distinct sets: behavioral and normative (Figure 2A). The behavioral beliefs are postulated to be the underlying influence on an individual's attitude toward performing the behavior, whereas the normative beliefs influence the individual's subjective norm about performing that behavior (Madden et al., 1992). Hence, information or salient beliefs affect intentions and subsequent behavior through attitudes and/or through subjective norms (Madden et al., 1992). As noted by Fishbein and Ajzen (1975), variables external to the model are assumed to influence intentions only to the extent that they affect either attitudes or subjective norms.

The theory of planned behavior (Ajzen, 1985) extends the boundary conditions of pure volitional control specified by the theory of reasoned action. This is accomplished by including beliefs regarding the possession of requisite resources and opportunities for performing a given behavior (Madden et al., 1992). The more resources and opportunities individuals think they possess, the greater should be their perceived control over the

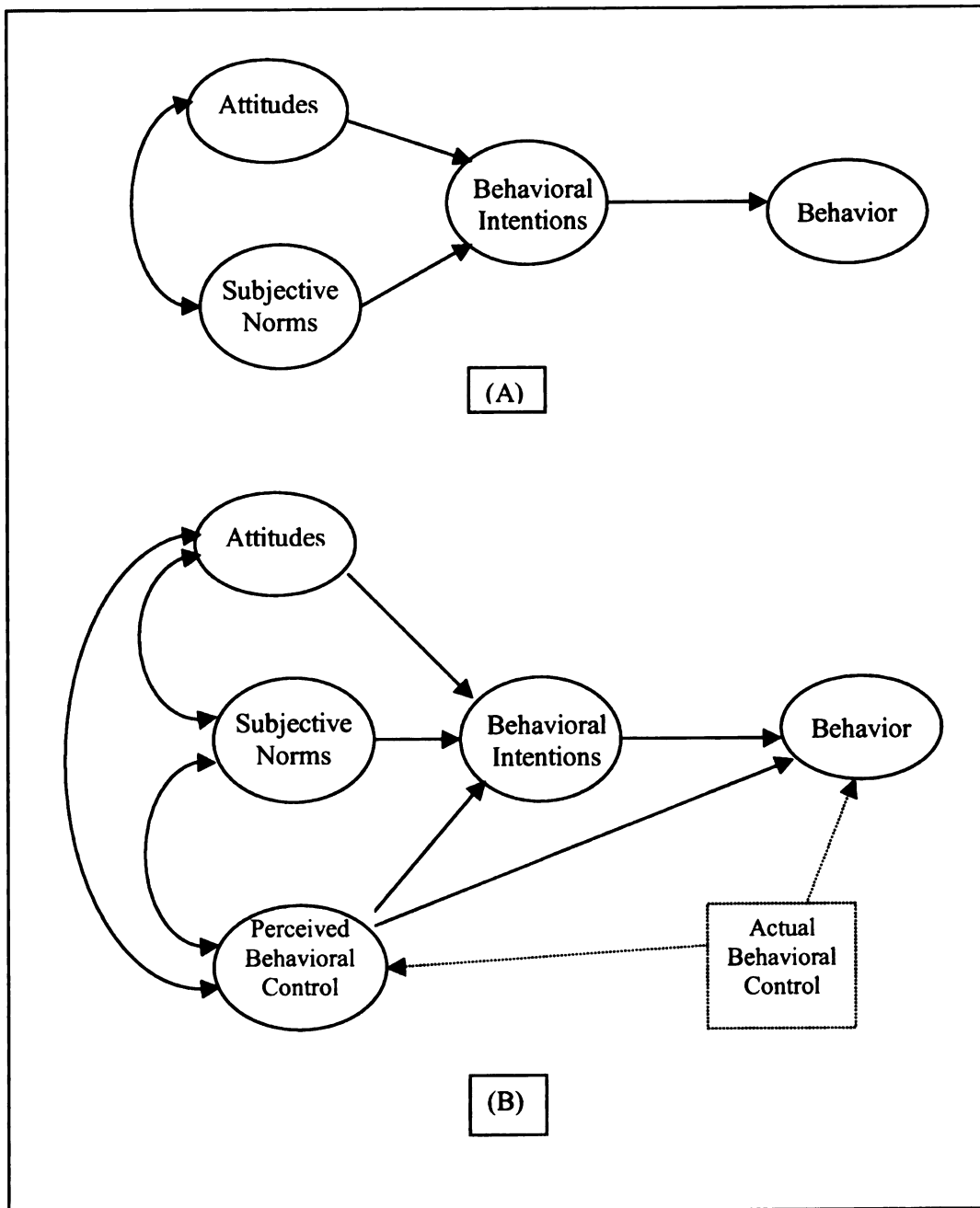


Figure 3: Path Models for Theory of Reasoned Action (A) and Theory of Planned Behavior (B)

Source: Ajzen, 2002

behavior (Ajzen, 1985). That is, when people have complete control over the behavior, intentions alone should be sufficient to predict the behavior and perceived behavioral control will make no significant contribution. In contrast, when a behavior is not under complete volitional control, perceived behavioral control (to the extent that it is accurate) provides important information that should add to the predictability of the model (Madden et al., 1992).

Figure 2B presents the theory of planned behavior. Perceived behavioral control is included as an exogenous variable that has both a direct effect on behavior and indirect effect on behavior through intentions. The indirect effect is based on the assumption that perceived behavioral control has motivational implications for behavioral intentions. When people believe they have little control over performing the behavior because of a lack of requisite resources, then their intentions to perform the behavior may be low even if they have favorable attitudes and/or subjective norms concerning performance of the behavior (Eden, 1993; Madden et al., 1992). Bandura, Adams, Hardy, and Howells (1980) have provided empirical evidence that people's behavior is strongly influenced by the confidence in their ability to perform the behavior. The theory of planned behavior specifies that for behaviors not completely under volitional control, perceived behavioral control will add to the prediction of behavior over and above the effect of behavioral intentions (Ajzen & Fishbein, 1977; Sutton, 1998).

The direct path from perceived behavioral control to behavior is assumed to reflect the actual control an individual has over performing the behavior. Since the model used for the presented research does not directly measure behavior, this link cannot be tested and further discussion is therefore unwarranted.

The Behavioral Intention - Behavior Relationship

Sutton (1998) showed in his meta-analyses that when behavior was predicted from intentions only, the product-moment correlation ranged between .44 and .62 (i.e. explaining between 19% and 38% of the variance). In Cohn's (1992) terms, these would all be described as medium or large effects.

There are several reasons that may cause poor predictive power; Sutton (1998) cites nine possibilities, but of particular interest to this researcher is the principle of correspondence (Ajzen & Fishbein, 1977; Fishbein & Ajzen, 1975) since it can be partially controlled for in the survey instrument. The principle of correspondence states that in order to maximize predictive power, the predictor (attitude) and the criterion (intentions) should be measured at the same level of specification or generality (Ajzen & Fishbein, 1977; Ajzen & Fishbein, 1980; Sutton, 1998). The measure should be matched with respect to four components, action, target, time and context. There is substantial empirical evidence to support this idea (Ajzen, 1991; van den Putte, 1993) and consequently this study uses theories surrounding environmental philosophies and justice to guide the formulation of the independent variable based upon value orientations and general attitudes (see environmental justice and the fairness heuristic section).

Attitudes

One of the first attempts at quantifying the strength of the relationship between attitude and environmental behavior was Hines, Hungerford and Tomera's (1986) meta-analysis. For the purposes of their study, the attitudinal variable included those factors that dealt with the individual's feelings with regard to particular aspects of the environment or objects related to the environment (Hines et al., 1986). Therefore, their

categorization of attitude included assessments of general attitude towards the environment as well as more specific attitudes such as those towards the energy crisis, unleaded gasoline and taking environmental action. No distinction was made between affective and cognitive components of attitudes.

Fifty-one outcome measures on the attitude–behavior relationship were coded. Meta-analysis of the full set of these studies resulted in a corrected correlation coefficient of .347 (SD = .224). Further examination of the data was conducted in an effort to determine the nature of the attitudes under study. Consequently, forty-two of the attitude studies coded dealt with attitudes towards the environment while nine studies were concerned with attitudes towards taking action. A slightly stronger relationship was detected between attitude towards action and behavior ($r = .377$, SD = .145) than was observed between attitude towards the environment in general and behavior ($r = .338$, SD = .243). Contrary to most studies when actual behaviors were assessed, the correlations were higher than when behavior was self-reported ($r = .427$, SD = .290). Similarly when the individuals in the studies had ties to environmental organizations, the correlations were higher ($r = .593$, SD = .273).

One will note that the Hines, Hungerford and Tomera's (1986) meta-analysis reported on the attitude-behavior relationship and did not make the distinction between behavioral intentions and behaviors. It is also somewhat dated. Therefore, it seems prudent to conduct a review of more recent environmental studies and where possible to examine issues surrounding water management.

Although used as a measure of environmental attitudes, beliefs, values and worldviews, the New Environmental Paradigm Scale has been widely used over the past

two decades. It has been used most often with samples of the general public, but it has also been used with samples of specific sectors such as farmers (Dunlap, Van Liere, Mertig, & Jones, 2000). In general, the studies have found a relatively strong endorsement of NEP beliefs across the various samples (i.e. correlations similar to the Hines et al., 1986 study above). Both the ability to predict and identify groups from a sample are forms of criterion validity. In studies of environmental interest groups, NEP studies have consistently found that environmentalists score higher on the NEP scale than the general public (Edgell & Nowell, 1989; Pierce, Steger, Steel, & Lovrich, 1992; Widegren, 1998). Similarly, despite the difficulty of predicting behaviors from general attitudes and beliefs, numerous studies have found significant relationships between the NEP Scale and various types of behavioral intentions as well as both self-reported and observed behaviors (Shultz & Oskamp, 1996; Stern et al., 1995). Therefore, the overall evidence suggests that the NEP and other general attitudinal scales possess criterion validity.

Turning toward environmental studies that focus on a specific environmental attitudinal object (e.g., forests), it can be shown that the correlation between attitude and intentions not only increases, but that the correlation between attitude and intention is greater than that between attitude and measures of behavior. Also, as expected from the general studies, these increases are especially significant if the study population has an interest in the attitudinal object such as a hunter might have about deer. For example, Fulton, Manfreda and Lipscomb (1996) found that attitudes mediated the relationship between value orientations and behavioral intentions for 1,202 adult residents of Colorado when asked about hunting/fishing and viewing of wildlife. They found the path

between hunting/fishing attitudes and intention to be significant ($\beta = .79$, $t = 11.73$, $p \leq .001$) as was the path between wildlife viewing attitudes and intentions ($\beta = .56$, $t = 8.84$, $p \leq .001$). In both cases the paths between value orientations and intentions was not significant.

In two other studies, one by Hrubes, Ajzen and Daigle (2001) on hunting attitudes and behavior and one by Vaske and Donnelly (1999) on wildlands preservation, similar results to the Fulton et al., (1996) study were found. Of the 727 people mailed a survey from a list of those who purchased hunting licenses in Vermont in 1997, 395 predominantly white males (73%) showed a significant relationship between attitudes and intentions ($\beta = .58$, $p \leq .01$). With regard to wildland preservation, 960 residences (53% response rate) living along the Front Range region of Colorado also demonstrated a significant relationship between attitudes and intentions by indicating a pro-wildland preservation voting intention ($\beta = .94$, $p < .001$, $R^2 = 88\%$).

There are just two studies on water management using the theory of planned behavior or theory of reasoned action. In a study on whether to adopt micro-irrigation techniques on 44 strawberry farms in the State of Florida, Lynne (1995) found several interesting relations. First, it was found that perceived control was important in explaining both the decision of whether or not to adopt micro-irrigation techniques and how much to invest in conservation technology. Second, it was found that the significance of the subjective norm variable implied farmers are influenced by community norms for water conserving behavior and that individuals who are more influenced by the community will be more likely to adopt and will adopt more intensively. The researchers maintain that the significance for perceived control, which is

another type of community influence, showed that coercive control (which would reduce perceived control) could be counter productive. That is, it would not only slow the move to becoming an adopter, but also reduce the intensity of investment in conserving technology. They also found that actual control was significant. The fact that both perceived behavioral control and actual control added significant explanatory power also suggested that measuring only financial influence on investment is insufficient.

The second study by Luzar and Cossé (1998) was on Louisiana well owners' willingness to pay for changes in state level water quality. They found that the attitudinal variables significantly enhanced the explanatory power of their willingness to pay models at both the state and individual levels. The state wide model improved from $R^2 = .08$ to $R^2 = .19$ with the attitude variables and at the local level from $R^2 = .10$ to $R^2 = .22$ at the individual level (both at a 90% level of confidence). Additionally, the subjective norm variable was positive and significant in both models.

Several other variables were also found relevant to the Luzar and Cosse model. Ownership of a private source of drinking water was positively associated with willingness-to-pay for improvements in water quality. The presence of young children in the respondent's household was positively and significantly associated with willingness-to-pay for changes in water quality. Respondents with higher income were not only willing to pay, but able to pay for changes in water quality. There was a non-linear significant positive relationship between an individual's age and education and willingness-to-pay. Not statistically significant were explanatory variables indicating occupation and gender.

Personal Responsibility

Geller (1995) has proposed that certain psychological states or expectancies affect the propensity for individuals to actively care for the safety or health of others. The term active caring refers to individuals who care enough about a particular problem or about other people to implement an intervention process in attempts to make a beneficial difference (Geller, 1995). By this definition, active caring is equivalent to the personal responsibility variable in this study and is considered a social norm. Allen and Ferrand's (1999) study of college students' tests Geller's hypothesis that actively caring is an important mediator leading to environmental concerns and action. They found no evidence of a direct relation between personal control and environmentally friendly behaviors. Instead, and consistent with Geller's (1995) model, sympathy (i.e. the proxy used for active caring) was found to mediate the relation between personal control and total environmental behaviors. Specifically, the path from sympathy to total environmentally friendly behavior was significant ($\beta = .39$, $t(94) = 3.47$, $p = .005$), but the direct path between personal control and total environmentally friendly behavior was not significant ($\beta = .14$, $t(94) = 1.15$, $p = .25$). While Allen and Ferrand's (1999) results support Geller's hypothesis, Hwang et al.'s (2000) study on forest management found only a small relationship between personal responsibility and intent to act ($\beta = .20$, $t=4.36$).

A parallel line of research examining the relation between altruistic social norms and environmentally responsible behavior is also consistent with Geller's (1995) views. Specifically, Herberlein (1972) maintained that protecting the environment is perceived as a moral and altruistic issue because environmental damage has negative consequences for others. As a result, Herberlein (1972) suggested that Schwartz's (1970; 1977) moral

norm activation model of altruism could be used to predict environmentally friendly behaviors. Schwartz's model predicts that altruistic behavior results when a moral norm is activated. This activation occurs when an individual becomes aware that their behavior has possible negative consequences for others and is willing to take personal responsibility for the other's well being. Therefore, Heberlein (1972) suggested that individuals should act to protect the environment in situations similar to those that elicit altruism: when an individual is both aware that their actions can have negative consequences for the environment and feels personally responsible for these consequences.

Several authors (e.g. Guagnano, 1995; Hooper & Neilsen, 1991; Van Liere & Dunlap, 1978) have acted on Heberlein's suggestion and have demonstrated that Schwartz's (1970, 1977) model can be used to predict environmentally friendly behavior. For example, Van Liere and Dunlap (1978) found that individual rural residents who were both aware of the negative environmental consequences of burning yard waste and who also accepted responsibility for the environmental consequences of burning were least likely to burn yard waste. Similarly, but more globally, Guagnano (1995) found that residents' awareness of the environmental consequences of their actions and their willingness to take responsibility for these actions combined to predict willingness to take action to protect the environment on a range of issues. These findings are consistent with Geller's model in that they demonstrate environmentally friendly behaviors are at least partly a function of altruism.

Locus of Control

The locus of control (LOC) factor in the model represents one of the most extensively researched variables. Locus of Control refers to a general belief regarding the location of forces controlling an individual's life (i.e. internal vs. external factors). Persons with an internal locus of control believe they normally have personal control over important life events as a result of their knowledge, skill and abilities (Geller, 1995). In contrast, people with an external locus of control believe factors like luck, chance or fate have significant influence in their lives (Rotter, 1966). Therefore, people with an external LOC generally expect to have less personal control over the pleasant and unpleasant consequences they experience than do people with an internal LOC. The use of LOC for the proposed model of community action would appear justified since it encompasses both external and internal components of an individual.

There exists an intimate relationship between LOC and personal responsibility (Eden, 1993). This is because individuals focus on actionable responsibility, not solely on moral responsibility (Eden, 1993). To be actionable, an individual must perceive the internal control they can maintain over the outcomes of their behavior. That is, they have a strong belief in their own efficacy. Therefore, the identification of pro-environmental behavior is not only based upon it being responsible, but also possible and efficacious.

Actionable responsibility is curtailed by its context in that behavior is only morally required within its efficacious range, which is usually an immediate one. Rather than suggesting mere self-interest, the immediacy of responsibility points to individuals being necessarily preoccupied with immediate issues (O'Riordan & Rayner, 1991). Beyond the immediate, efficacy is weakened which in turn weakens perceived responsibility (Eden, 1993). It becomes pointless to ascribe responsibility to the self to

undertake behavior that has no effect. There is an implicit utilitarian ethos to this reasoning in that responsibility is not limited because of morality alone, but functionally because of its efficacy in curtailing environmental damage (Eden, 1993). This supports Schwartz's (1970) emphasis on awareness of the consequences (see below) of a person's actions as contributing towards responsible behavior. Therefore, context is influential in that it affects how efficacy is perceived. Efficacy is reinforced (or not) by societal norms underlying the need for setting individual pro-environmental behaviors within social circumstances (Eden, 1993).

In recent years, there have been numerous studies aimed at exploring the relationship between locus of control and environmentally responsible behavior (Hines et al., 1986; Sia, Hungerford, & Tommera, 1985/86; Smith-Sebasto, 1992). As a result of this work, it has been suggested that instruments created to measure LOC as it relates to a specific situation or behavior should yield more reliable results than a generic scale (Lefcourt, 1982; Phares, 1976; Rotter, 1975). This would suggest if researchers wish to create a locus of control instrument that would allow for precise predictions of environmentally responsible behavior, they should construct items with referents to specific environmentally responsible behaviors or actions (Smith-Sebasto & Fortner, 1994). Therefore, the instrument designed for this research was adapted from the Environmental Action Internal Control Index (EAICI) (Smith-Sebasto & Fortner, 1994) to the context of BMP implementation for watershed management.

The EAICI was chosen because evaluation of previous instruments concluded that their internal consistency and validity were questionable (Smith-Sebasto & Fortner, 1994). The development of the EAICI started with the identification of examples of pro-

environmental behaviors from numerous published sources in the popular press. Items that eventually became part of the instrument were those that should have a high behavior-attitude relationship (Ajzen & Fishbein, 1977, 1980). The EAICI instrument is comprised of 28 items of which six have been adapted to the context of watershed management for the purposes of this study.

The Smith-Sebasto and Fortner (1994) study of undergraduate university students found the correlation between LOC (as measured by the EAICI) and environmentally responsible behavior was modestly positive ($r = .33$) at the .01 level of significance (Smith-Sebasto & Fortner, 1994). Through discriminant analysis they also found the EAICI accurately classified individuals self-reported environmental behavior in almost 82% of the cases. Further discriminant analysis showed that the EAICI could also accurately classify individuals on the basis of perceived knowledge or skill at the use of environmental action strategies (Smith-Sebasto & Fortner, 1994).

Knowledge

In natural resource management, the level of factual knowledge has been identified as an external variable that links values and attitudes (Tarrant, Bright, & Cordell, 1997). Although the effect of knowledge on attitudes is not conclusive, there have been numerous studies suggesting a link between the two. For instance, Bright & Manfredi (1997) concluded that individuals with higher knowledge levels have more positive attitudes than those with low levels of knowledge. Fortner and Lyon (1985) found a similar result when they studied the effects of viewing a Cousteau television special on attitudes, although the attitudinal change appeared temporary (lasting only approximately 2 weeks). Meanwhile, Steel et al. (1990) found that policy-relevant

knowledge was associated with perceptions of risk in the Great Lakes for Canadians but not Americans. There are two possible explanations for this ambiguity between studies: (1) the appropriate knowledge component for predicting attitude has not been identified (Boerschig & DeYoung, 1993; McKenzie-Mohr, Nemiroff, Beers, & Desmarais, 1995) and/or (2) that context matters (Ajzen & Fishbein, 1977). Despite these inconclusive findings, knowledge enhances the association between general environmental value orientations (and by extension worldviews) and environmental policy preferences by increasing the explained variance (Pierce, Lovrich, Tsurutani, & Abe, 1989; Steel et al., 1990; Tarrant et al., 1997). Thus, it has been included in the model.

Environmental knowledge can be categorized into three levels: (1) knowledge about the issues, (2) knowledge about the action strategy and (3) action skill (Boerschig & DeYoung, 1993; Hines et al., 1986). Interestingly, these different levels of knowledge are considered to influence the responsible environmental behavior in different ways. For example, Hungerford and Volk (1990) categorized environmental behavior related variables into categories: entry-level, ownership-level and empowerment-level. They suggested that knowledge about general concepts is considered an important variable for entry-level, in depth knowledge about issues for the ownership-level and knowledge about action strategies and skills for the empowerment level. This suggests that depending upon the context of the research, different types of knowledge should be elicited from respondents depending on the study goals.

Traditionally, researchers in the field of environmental education have claimed they can change behavior by making people more knowledgeable about environmental issues. The reasoning is that if one has more knowledge about the environment, the

awareness level should be higher, thus producing a more favorable attitude (Hungerford & Volk, 1990). Individuals with a more favorable attitude in turn will be more predisposed toward environmentally friendly behavior (see attitude section). Yet, more environmental knowledge does not necessarily mean an increase in environmentally responsible actions. A major difficulty in imparting environmental literacy lies in the simple fact that research has not yet satisfactorily identified the knowledge components that are precursors to responsible environmental behavior (Sivek & Hungerford, 1989). Nevertheless, many researchers have used the change of knowledge as an effective variable for explaining the change in environmentally responsible behavior (Sivek & Hungerford, 1989; Smith-Sebasto & Fortner, 1994).

The Smith-Sabasto and Fortner (1994) study of 853 undergraduate university students found several interesting relationships between knowledge, locus of control (LOC) and environmentally responsible behavior. A correlation of .23 ($p > .01$) between perceived knowledge of and skill at using environmental action strategies and LOC was found, indicating a low positive relationship. A discriminant analysis was performed between the scores on knowledge and LOC in an effort to assess whether knowledge could predict an individual's LOC orientation. Sixty-one percent of the grouped cases were correctly classified. When a discriminant analysis between LOC and knowledge was performed in an effort to predict an individual's knowledge level from their LOC score, eighty percent of the grouped cases were correctly classified. Hwang et al. (2000) found a more modest correlation between knowledge and LOC ($\beta = .02$). They attributed this modest relation to their using an instrument designed to test general environmental

knowledge as opposed to more specific questions on knowledge or skills in their subject matter (i.e. forest use).

Sabasto-Smith and Fortner's (1994) study also found a moderately positive correlation ($r = .483$, .01 level of significance) between knowledge and environmentally responsible behavior, while Hines et al. (1986) found a correlation of $r = .185$ in their meta-analysis. These findings are similar to several other studies (Sia et al., 1985/86; Sivek & Hungerford, 1989). However, the correlation between scores does not necessarily indicate a direct relationship. In fact it is assumed by many researchers that knowledge will influence attitude, which in turn will affect behavior (Hungerford & Volk, 1990; Newhouse, 1990). Results from the Hwang et al. (2000) study support this. They found a small relationship between knowledge and attitude ($\beta = .09$) and no significant relation between knowledge and intent to act. As was the case previously, the magnitude of this relationship could also have been affected by the use of a general knowledge instrument and that result should improve by testing other levels of knowledge such as those surrounding action skills and strategies (Boerschig & DeYoung, 1993; Hines et al., 1986). Regardless of the magnitude of the relationship, this finding still indicates that attitude is a mediator variable between knowledge and intention to act.

Hamilton (1986), Eden (1993) and others have suggested there exists a relationship between environmental knowledge and personal responsibility. This relationship is also intuitive; the more one knows about a subject the more likely they will feel a sense of personal responsibility, especially if the subject directly impacts on them. Beckwith and Rayl (2002) found a partial correlation coefficient of .1744 ($p = .005$) between general environmental knowledge and environmental responsibility among

college students. Also, Hwang, et al. (2000) found a small relationship between knowledge and personal responsibility ($r = .03$) in their study of forest management.

Demographic Variables

The extensive literature on environmental attitudes, age, education, urban residence and political ideology indicates that socio-demographic factors are found to have a consistent, substantially significant association with environmental attitude (Christianson & Arcury, 1992; Van Liere & Dunlap, 1980). The conclusions of these factors indicates that younger, better educated, urban, liberal individuals are more concerned about the environment and have more positive attitudes toward the environmental movement. Other factors that have weak or inconsistent relationships to environmental attitude include gender, income and occupational prestige (Christianson & Arcury, 1992; Samdahl & Robertson, 1989).

Income, education, gender (particularly male), and environmental attitude have a consistent positive association with public environmental knowledge (Arcury & Johnson, 1987; Arcury, Johnson, & Scollay, 1986; Lovrich, Pierce, Tsurutani, & Abe, 1986; Pierce et al., 1989). Age, being liberal and exposure to sources of information such as television news programs are less consistently correlated with environmental knowledge. Lovrich et al. (1986) also found that the perceived seriousness of a water problem to be positively associated with environmental knowledge and environmental knowledge to be positively associated with support for protective water policy measures.

Predicting and Explaining Intentions and Behavior Using TRA & TPB

This section summarizes the results of meta-analyses on the theories of TRA/TPB to determine the percentage of variance explained. These reviews vary greatly in terms of the number and type of studies included and the sophistication of the meta-analytic methods used. Table 2 presents this summary.

Table 2: Summary of Findings From Meta-Analyses of the TRA and TPB

Regression of attitudes and social norms or attitudes, social norms and perceived behavioral control on behavioral intentions	Effect Size	
	R	R ²
Reviewer		
Farley et al. (1981)	.71	.50
Sheppard et al. (1988)	.66	.44
Azjen (1991)	.71	.50
van den Putte (1993)	.68	.46
Conner & Armitage (1998)	.63	.40

Adapted from: Sutton, 1998, p. 1320

The findings for behavioral intentions show reasonable consistency with multiple correlations ranging from between .63 to .71. This accounts for between 40% and 50% of the variance. For intentions, the two theories are typically explaining no more than 50% of the variance. This seems disappointing in view of the fact that in the vast majority of the studies, intentions and its predictors are measured at the same time on the questionnaire using similar items; conditions that should maximize predictive power (Sutton, 1998).

There are a number of different standards of comparison that can be used in evaluating the percentage of variance explained. Neither the TRA nor TPB fare well by this standard. In practice, however, the maximum percentage of variance that can be explained in a real application is often substantially less than 100. For example Table 3 shows five effect size measures that can be calculated on a simple randomized control experiment on a smoking intervention program.

Table 3: Examples of How Different Effect Size Can Give a Different Impression

Randomized control trial of a new treatment for smoking			
Condition	N	Succeed	Fail
Intervention	100	70	30
Control	100	30	70
1	Difference in success rates = $70 - 30 = 40$		
2	Odds ratio = $(70 \times 70) / (30 \times 30) = 5.4$		
3	Relative success = $70/30 = 2.3$		
4	Product-moment r (phi-coefficient) = .40		
5	Percentage of variance explained = 16		

Adapted from: Sutton, 1998, p. 1323

The difference measure shows that the intervention improved the success rate by **40** percentage points. The odds of successfully quitting smoking were over five times **higher** in the intervention condition, compared with the control condition. The relative **success** rate shows that the intervention more than doubled the chances of successfully **quitting**. All of these measures suggest that the new treatment had a substantial and **clinically** useful effect. However, the percentage of variance explained in the **dichotomous** independent variable was 16 %, which seems unimpressive. Therefore, it **can be** concluded that the 40% - 50% of variance explained in the various meta-analyses of **TBA/TPB** are indeed large effect sizes (Cohn, 1992).

Summary

The beginning of this literature review proposed a theoretical foundation for the **study** of attitudes and their effect on intention to act. It began with presenting a hierarchy of **psychological** variables beginning with values and explained three theories of how **values** might operate in decision-making. Progressing up the hierarchy, the next section **focused** on value-orientations and beliefs and showed how these were founded in **individual** values and were relevant to worldviews. Worldviews were shown to be

general attitudes and represented value orientations within a context. Four relevant worldviews were presented. Drawing from cultural theory, the worldviews were hierarchical (high group/high grid), egalitarian, (high group, low grid), individualists (low, group, low grid) and fatalists (high grid, low group). The last section in part one dealt with attitudes and the fairness heuristic. This section discussed the philosophical tenants underlying this research instrument and presented its evolutionary development.

Part II of the literature review began by presenting the theory of planned behavior, which was the underling theory for the study design. The theory of planned behavior defined the scope of the research and defined the study variables. Having defined the variables, the remainder of the literature concerned itself with reviewing the relationship between the study variables knowledge, locus of control, personal responsibility, attitudes and intent to act. Table 4 summarizes these findings.

Clearly, from this summary table it is apparent that the psychological variables of attitude, locus of control and personal responsibility are the most important variables in influencing behavior and behavioral intentions. Knowledge is important, but indirectly and its effects on behavior and intentions appear to be mediated by the other psychological variables. Lastly, demographic variables are poor predictors of behavior and behavioral intentions.

Table 4: Summary of Findings on the Strength of the Relationships Between Psychological Variables

Variable Relationships	Correlation	Beta Weights	Study
Intention - Behavior	.44 - .62		Sutton (1998)
Attitude - Behavior	.35		Hines et al. (1986) – meta analysis
	.17		Beckwith & Rayl (2002) - undergraduates
Attitudes – Intentions		.56 - .79	Fulton, et al. (1996) - hunting/wildlife viewing
	.18	.09	Hwang et al. (2000) – forest
		.58	Hrubes et al. (2001) – hunting
		.94	Vaske & Donnely (1999) - wildland
	.28 - .47		Luzar & Cosse (1998) - water quality
Attitude - Responsible		.10	Hwang et al. (2000)
	.43		Beckwith & Rayl (2002)
Responsible - Intention	.10		Hwang et al. (2000)
Responsible - Behavior		.39	Geller (1995) – safety & health
	.33		Hines et al. (1986)
	.44		Allen & Ferrand (1999) – undergraduates
	.36		Beckwith & Rayl (2002)
LOC -Responsible	.17	.13	Hwang et al. (2000)
LOC - Behavior	.31		Allen & Ferrand (1999)
	.33		Smith–Sabasto (1994) - undergraduates
	.36		Hines et al. (1986)
LOC - Intent		.20	Hwang et al. (2000)
	.37		Hines et al. (1986)
LOC - Attitude	.39	.39	Hwang et al. (2000)
Knowledge - Behavior	.05		Hwang et al. (2000)
	.30		Hines et al. (1986)
	.17		Beckwith & Rayl (2002)
Knowledge – Attitude	.09	.09	Hwang et al. (2000)
	.18		Beckwith & Rayl (2002)
Knowledge – LOC	.02	.02	Hwang et al. (2000)
	.23		Smith–Sabasto (1994)
Knowledge -	.03	.02	Hwang et al. (2000)
	.24		Beckwith & Rayl (2002)
Education – Behavior	.18		Hines et al. (1986)
	.48		Smith–Sabasto (1994)
Age – Behavior	-.15		Hines et al. (1986)
Income – Behavior	.16		Hines et al. (1986)

CHAPTER III:

METHODOLOGY

Study Design

This study attempts to discover people's worldviews, attitudes and the intent to support the implementation of best management practices based upon selected antecedents. The data collection method is a mail survey. A mail survey was chosen in order to secure a sufficient sample size to be able to infer characteristics, attitudes, and behaviors for the entire watershed population (Babbie, 1990). There was also a need to be able to support policy options quantitatively.

Background

The study was conducted in Sycamore Creek, a sub-watershed of the Red Cedar River, which is part of the central Michigan portion of the Grand River watershed. The watershed drainage area is approximately 67,740 acres and is located in the center of Ingham County (NRCS, 1990). The primary land use in the southern half of the watershed is agriculture with one major population center (the City of Mason). The northern half of the watershed covers part of each of the cities of Holt and Lansing. Also, approximately 1,500 acres of Michigan State University farmland is located in the northern part of the watershed (NRCS, 1990).

Several problems have been identified in the Sycamore Creek watershed. The major types of pollutants to be controlled are sediment from soil erosion, phosphorous fertilizers, nitrate fertilizers and agricultural pesticides (NRCS, 1990). These pollutants cause sedimentation and turbidity problems, nuisance algae growth and

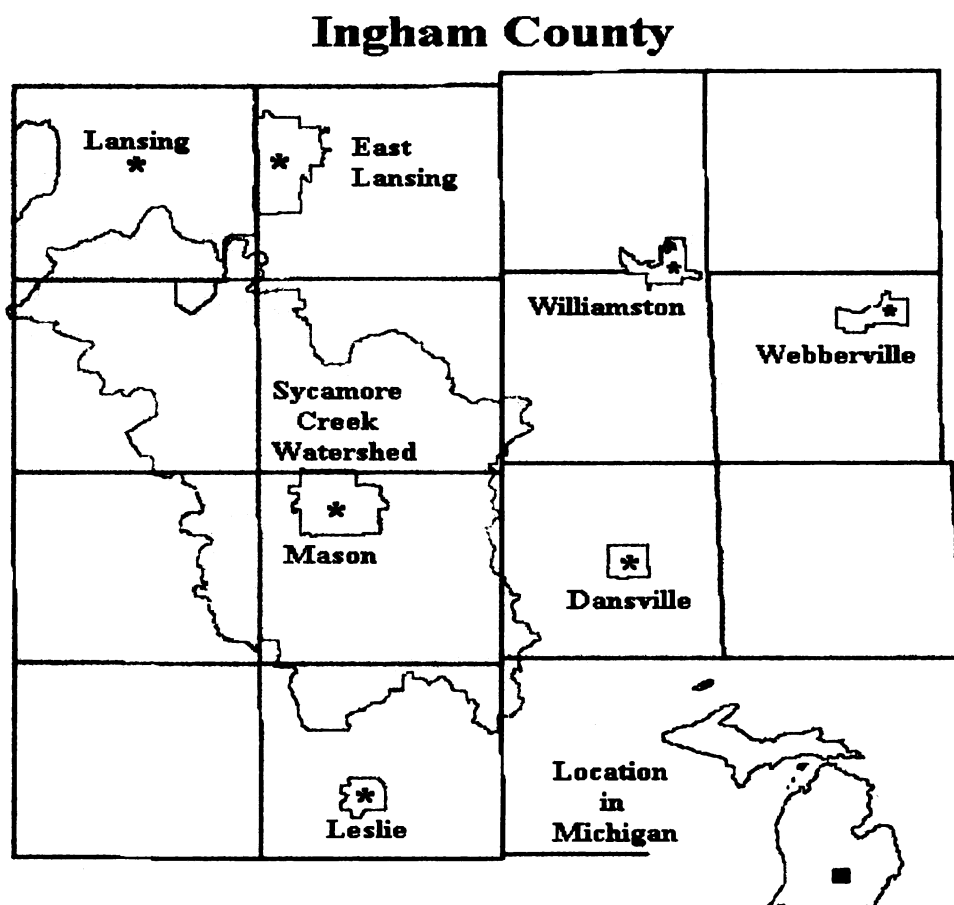


Figure 4: Map of Sycamore Creek Watershed in Relation to Ingham County, MI

groundwater contamination (NRCS, 1990). These types of problems are frequently addressed by the instillation of best management practices by property owners.

Population and Sample

The study sample was drawn from Ingham County's 2001 tax database. There are 21,801 properties on the tax roll within Sycamore Creek watershed. Since the independent variable of the study is individual attitudes, the research focused only on the 16,991 residential and agricultural properties. The categories of residential and

agricultural land were determined using a code assigned to each property indicating its land use. The categories of commercial, industrial and developable were excluded. These required codes are standardized for the State of Michigan.

Each of the residential properties was assigned a computer generated random number. It was determined through the use of a standard sample size formula (Babbie, 1990) that there needed to be 376 respondents in order to achieve a 95% confidence level and 639 respondents to achieve a 99% confidence level. An initial mailing of a letter of introduction and explanation consisted of 1,750 property owners. The names of those residents whose letters were not able to be delivered were removed from the mailing list for the first survey. A total of 1,650 property owners were mailed questionnaires with the hope there would be sufficient respondents to achieve the 99% confidence level. The sample was comprised of 1576 randomly selected residential properties and all 74 agriculture properties. To be included in the sample, a property owner had to reside either within the Sycamore Creek watershed or the greater Red Cedar watershed. Due to of the small number of agricultural properties, there was no attempt to separate them out as a unit of analysis.

After removing those questionnaires that remained undeliverable or were either refusals or blank returns, there remained 1,542 usable surveys. Of these 1,542 questionnaires, 608 usable surveys were returned for an overall response rate of 39%. It should be noted that the response rate might have been higher had not the mailing occurred shortly after the events of September 11, 2001 and also which pushed the study's mailing into the holiday season.

Instrumentation

The questionnaire was constructed from both original research material and components from other research instruments. Dillman's (2000) Tailored Design Method was used to guide both construction and administration of the mail survey. The questionnaire had seven sections: (1) Use and Thoughts About the Red Cedar River; (2) Water Quality Concerns; (3) Best Management Practices; (4) BMP Combinations; (5) Choice Experiment and Implementation Information; (6) Attitudes and Beliefs; and (7) Demographics. Only part of section 1 and sections 2, 3, 5, 6 and 7 were used for this study.

Initially, three focus groups were conducted with local experts in an effort to understand the issues surrounding BMPs and to establish content validity. The scientific panel, as it came to be known, was drawn from organizations such as the Michigan Department of Environmental Quality (MDEQ), the National Resource Conservation Service (NRCS), Michigan State University Extension (MSUE), various departments at Michigan State University and the Soil Conservation District. The information collected in these focus groups helped determine survey content and structure in general and more specifically, the policy choices presented in the questionnaire (section 5).

The questionnaire was designed using Hines, Hungerford and Tomera's (1986) proposed model of responsible environmental behavior (Figure 1 is presented below again for convenience). This model was chosen for two reasons: (1) it contained all the elements required by the Theory of Planned Behavior, but (2) it was not a path analytic model. It was felt that the lack of previous research on attitudes toward water resource management in a specific context would make it likely that any method reliant upon the tight definition of the factors (as needed in a path analytic model) would fail. That is,

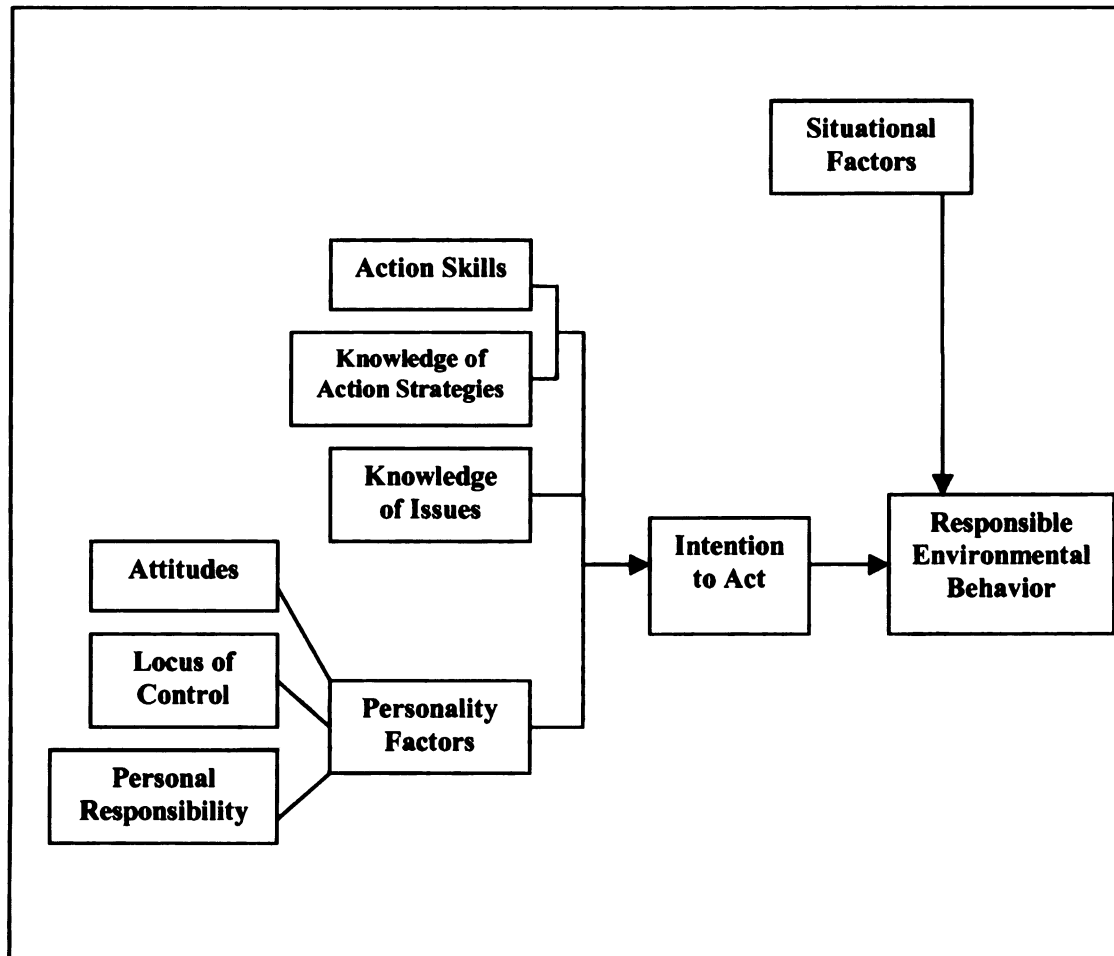


Figure 5: Hines, Hungerford and Tomera's (1986) Proposed Model of Responsible Environmental Behavior

even if the factor scales were valid and reliable in a previous context, it does not guarantee success in a new context due to the restructuring of the factors towards a new attitudinal object by individual respondents.

This study concerns itself with the intention to act and its antecedents.

Furthermore, since there is not an action skill required by the respondent in order to support (or not) the implementation of BMPs by municipalities, this factor is superfluous and not included in the model. Specific situational factors were not able to be totally captured by the survey instrument although there was considerable effort to establish

context. Consequently, the final model used in this study is presented in Figure 1. The overall questionnaire design followed the pattern of eliciting general information from the respondent, educating them about the current problems and possible solutions and then asking them what they wish to do about the problem.

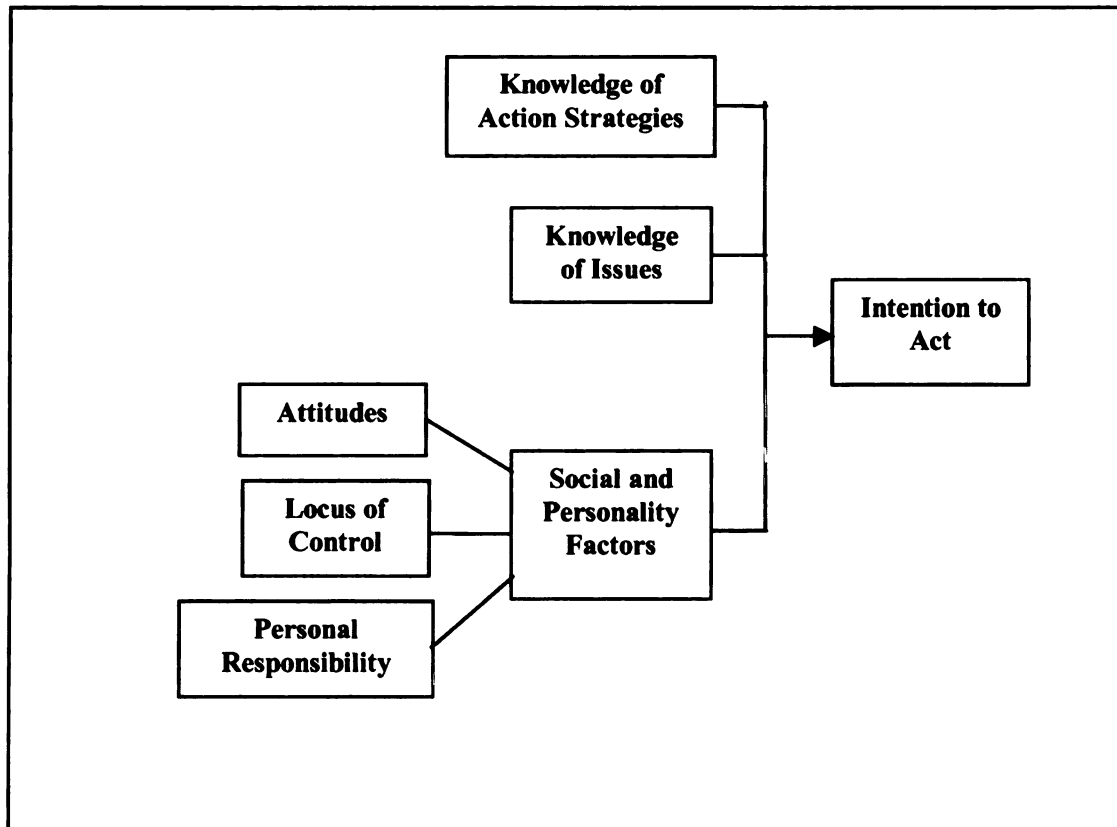


Figure 1: Proposed Model of Responsible Environmental Behavioral Intentions
Based on Hines, Hungerford and Tomera (1986)

Knowledge of the Issues and of Action Strategies

An index of *Knowledge of the Issues* was created through summing responses to five dichotomous, yes (1) or no (0) questions (Q6-Q10). This section contained questions such as whether the respondent knew about stormwater overflow plans and non-point source pollution. A *Knowledge of Action Strategies* index was similarly created through summing responses to six yes (1) no (2) or don't know (0) questions (Q11-Q16). This

section contained questions on whether they knew about each of six structural BMPs used to control stormwater runoff. The use of a dichotomous variable is consistent with other studies measuring knowledge (Reading, Clark, & Kellert, 1994, Fortner & Lyon, 1985 #294; Steel et al., 1990) with the reasoning being that the respondent either possesses the knowledge or they do not and the higher the score on the index, the greater one knows. Those respondents indicating “Don’t Know” in the knowledge of action strategies index were included in the “No” category for the analysis.

Attitude

Construction of the *Attitude* factors was developed from items contained in the fairness heuristic instrument as reported by Syme, Nancarrow and McCreddin (1999). The attitude section consisted of twenty closed ended questions (out of thirty one possible questions from the original instrument). A five-point Likert agree/disagree response format was used. Questions range from inquiring whether people believed the “...environment had the same right to water as people” to “...whether those people upstream had a moral responsibility to look after those downstream”.

Locus of Control

Several locus of control (LOC) instruments have been developed to measure the relationship between LOC and environmentally responsible behavior. In their 1994 article, Smith-Sabasto and Fortner demonstrated the internal consistency and validity of these instruments were questionable. Their research compared the Environmental Action Internal Control Index (EAICI) to other LOC instruments (e.g. Brown LOC, Index Control Index and Need for Control Scale) and found that the EAICI was more highly

correlated with environmentally friendly behavior than other instruments. Furthermore, the correlation coefficients between the various scales studied lent support to the EAICI's convergent and discriminant validity. Therefore, the EAICI was chosen to assess individual levels of locus of control on managing the Sycamore Creek watershed (Smith-Sebasto & Fortner, 1994). Internal consistency of the original scale is reported at .92 for Cronbach's alpha. Of the 28 questions used in the original instrument seven were adapted for the current study with an alpha of .89.

Personal Responsibility

The four-item *Personal Responsibility* scale was constructed from one two-item scale and two additional questions. The two-item scale is derived from the Ascription of Responsibility factor within Schwartz's Norm Activation Scale as reported by Guagnano, (1995). The items were originally identified by face validity and checked by conducting a factor analysis using principal-components techniques with oblimin rotation. Item factor loadings were both greater than .75 with an eigenvalue of 1.07 and Cronbach's alpha of .65. The "I am partially responsible for the degraded state of our local rivers and streams" question was used in the Hwang et al. (2000) study and found to correlate with other variables in their study (which were similar the ones used in this research). The final item was constructed by the researcher and appears to have face validity. Therefore, three of the four items had either concurrent validity or construct validity as well as face validity. Internal consistency of personal responsibility scale used in this research was .81.

Intention to Act

There were seven *Intention to Act* statements. Their design was based on information gathered from the scientific panel (see above) and a review of the literature. Each statement asked the respondent to indicate their level of support for each of the following items: zoning of open space; subsidies to landowners for environmentally friendly practices; stricter enforcement of current regulations; creation of new regulations; public information and education programs; and voluntary programs. Although the seven items were created to be independent of each other it was found they had an alpha of .88 when scaled.

Questionnaire Construction and Design

The resulting thirty multiple part questions were pre-tested with two separate groups of individuals. The first group of twenty individuals was drawn by reaching out to the local community and requesting volunteers. Many of the names were provided by MSU-Extension and Communications Department. This group was not considered to be representative of the Sycamore Creek watershed, but rather was a convenience sample necessitated by the availability of recording facilities. Each respondent was debriefed for twenty to thirty minutes after they had completed the survey. Questions were further revised based upon an item analysis of the pre-test and comments made by the respondents. Revisions at this point were mostly minor, consisting of some additional wording and layout changes. The major change was the deletion of two questions on the creation of markets for pollution trading. Most respondents were not familiar enough with the concept to make a judgment and the researcher felt it was too difficult a concept for the survey to try and convey in addition to the current content.

The revised questionnaire was then pre-tested a second time. This time an intercept approach was taken to selecting respondents. People entering the Michigan Secretary of State office in Mason seeking their automobile license renewal were asked to participate while they waited. This was intended to be a convenience sample and was not representative of the watershed population. The main purpose of this pre-test round was to assess face and content validity as well as user understandability. Ten individuals agreed to take the survey and be debriefed afterwards. Very minor changes to wording and layout were made based upon the respondent's comments.

The complete instrument consisted of thirty-four Likert scale questions (five choices from strongly disagree to strongly agree) on attitudes, personal responsibility and locus of control; twenty questions on the frequency of current uses and the importance of future uses; one question on perceived water quality; five items on water quality knowledge and six on knowledge of best management practices; three choice experiment questions; seven on implementation information, one on preferred sources of information; and eight demographic questions. The number and complexity of the questions were limited by the time required to take the survey. It was felt that the questionnaire needed to be able to be completed within a twenty to thirty minute time frame (Dillman, 2000).

As mentioned previously, the study roughly followed Dillman's protocol for mail survey administration (Dillman, 2000). Five mailings were used to administer the survey. Seventeen hundred and fifty randomly selected people were initially mailed a pre-letter introducing the study and informing them they would be receiving a questionnaire in the mail within the next week. The undeliverable pre-letters were deleted from the mailing

list for the first mailing of the survey and the list was further reduced to arrive at a total of 1,650 potential respondents. The questionnaire was mailed to potential respondents together with a postage-paid return envelope and a cover letter again explaining the study and reminding them that participation in the study indicated their informed consent. Reminder post cards were sent 14 days later to individuals who had not yet returned completed questionnaires. Twenty-five days after the first mailing, new cover letters and replacement surveys were sent to those whose original questionnaires were still outstanding. A final reminder post card was mailed 10 days later to individuals who had not yet returned a survey.

Data Analysis

There were 608 usable questionnaires returned plus 36 undeliverable, 23 return to sender and 19 blank surveys. Response bias was determined by telephoning 20 non-respondents to establish why they chose not to participate.

To help the reader keep track of the research questions, variables and the items on the questionnaire they are summarized in Table 5.

The data were analyzed using the statistical package, SPSS 10.1 (2001). Questions 3b and 22g were reverse coded so they were directionally consistent with each of the other variable questions. Then the FREQUENCIES procedure was applied to obtain a “picture” of the data in the form of raw frequencies and percentage of occurrence for the sample.

Initially, descriptive statistics were referenced. Then, an exploratory factor analysis using principal axis analysis with varimax rotation was computed to determine how many attitudinal dimensions existed. Five factors with eigenvalues greater than 1.0

Table 5: Research Questions, Study Variables and the Items on the Questionnaire

Variable Name	Research Question	Item(s) on Survey
Attitude (independent)	Q1: What attitudinal groups exist in the watershed?	Q22a-t
	Q2: What is the composition of each group?	Q22a-t; Q23-Q30
	Q3: What are the fairness evaluations?	Q22a-t
Personal Responsibility	Q4: What is the relationship b/w attitude groups and Personal Responsibility?	Q22a-t; Q3a-d
Knowledge of Issues	Q5: What is the relationship b/w attitude groups and Knowledge of Issues?	Q6-Q10
Knowledge of Action Strategies	Q6: What is the relationship b/w attitude groups and Knowledge of Action Strategies?	Q11-Q16
Locus of Control	Q7: What is the relationship b/w attitude groups and PR?	Q4a-f
Intent to Act (dependent)	Q8: Do attitudinal groups differ in their Intent to Act?	Q22a-t; Q20a-g
	Q9: What is the relationship among all the variables?	All above items
	Q10: Do the attitudinal groups differ in terms of variables that influence Intention to Act?	All above items

were produced. After dropping items that failed to load at greater than .40 on any of the five factors along with those items not meeting face validity inspection, there remained three factors. Confirmatory factor analysis was performed on the remaining three factors to establish internal consistency and to confirm the results of the principal axis analysis. Based on this analysis, the three factor solution was reduced to two. Confirmatory factor analysis was again run on the final two factors. Next, a hierarchical cluster analysis was performed on the resulting factors to identify groups of individuals who responded similarly to the attitude dimensions. An agglomeration schedule explaining the greatest difference between clusters was computed using a squared Euclidean distance measure of Ward's method. The resulting dendrogram indicated there were two clusters of respondents. K-means cluster analysis with two clusters (based on the hierarchical

results), was run to produce a new variable indicating respondent's cluster membership. Finally, because the investigator was interested in the relationship between the resulting clusters of "types of attitudinal orientations" and socio-demographic variables the crosstabs procedure was run.

The researcher was also interested in the relationships between the other study variables and the attitudinal orientations together with their influence on intention to act. After either a scale or index was created through summing individual responses to each item in a variable (see previous section on each variable), individual scores were assigned to the respondents and a new variable created. In order to better understand the relationships between all the variables, a correlation matrix was produced. Next, t-tests were computed to better understand the differences between clusters and each study variable. Finally, multiple regression (OLS) techniques were employed to evaluate the independent effects of specific variables on individual assessments of how to implement best management practices in the Sycamore Creek watershed. The regression analysis calculates results for the entire sample as well as for each cluster group.

CHAPTER IV:

DATA ANALYSIS AND INTERPRETATION

The purpose of this study was to assess the relationships between the antecedents of knowledge, attitude, locus of control and sense of responsibility on the intention to support the implementation of watershed best management practices. It was also designed to examine the fairness judgments underlying individual attitudes. This chapter has been divided into the following sections: (a) sample profile and biases, (b) constructing the attitudinal clusters, (c) cluster demographics, (d) fairness evaluations, (e) relationship between knowledge, personal responsibility, locus of control and the individualistic and egalitarian clusters, (f) the individualist and egalitarian clusters and the intention to act, (g) correlations between the study variables, (h) variables having the greatest influence on the intention to act, (i) non response survey and (j) study limitations.

Sample Profile and Biases

The following demographic variables were included in the study: age, income, education, number of people per household and length of residency in their current home and in the area. The purpose of profiling respondents was to address the representativeness of the sample to the Ingham County population and to see if demographic variables influence the intention to act. Population statistics were obtained from the 1990 and 2000 Census collected by the U.S. Census Bureau. Biases are addressed in the narrative. The results are in Table 5.

Table 6: Demographic Characteristics of Respondents Compared to the Population of Ingham County

Demographic Characteristics	Sample %	Population %
Age		
< 18 yrs old		26.4 ¹
(1) 18-24 years	1.0	8.4 ^{1*}
(2) 25-34 years	13.6	11.0. ¹
(3) 35-44 years	20.4	17.1 ¹
(4) 45-54 years	26.4	18.4 ¹
(5) 55-64 years	18.4	10.0 ¹
(6) 65+ years	20.2	8.7 ¹
Education		
(1) < HS Grad	3.3	16.1 ²
(2) HS or GED	17.2	23.8 ²
(3) Some College	30.5	30.9 ^{2*}
(4) College Grad	30.7	16.3 ²
(5) Post Grad	18.4	12.9 ²
Income		
(1) < \$10,000	2.3	10.5 ²
(2) \$10,000 - \$14,999	2.4	5.7 ^{2*}
(3) \$15,000 - \$19,999	3.4	7.0 ^{2*}
(4) \$20,000 - \$29,999	12.1	14.7 ^{2*}
(5) \$30,000 - \$39,999	17.3	15.1 ^{2*}
(6) \$40,000 - \$49,999	16.4	14.8 ^{2*}
(7) \$50,000 - \$59,999	14.3	8.0 ²
(8) \$60,000 - \$69,999	10.9	8.0 ^{2*}
(9) \$70,000 +	20.9	16.1 ^{2*}
Avg. Size of Household	2.2 people	2.6 ¹ people
Yrs Lived in Area	35.3 yrs	NA
Yrs in Current Home	17.5 yrs	~ 15.5 yrs ^{1*}

NA = Not Available

- Percentages may not add up to 100% due to rounding
- (1) Source: U.S. Census Bureau, Census 2000 (U.S. Census 2001)
- (2) Source: U.S. Census Bureau, Census 1990 (U.S. Census 1991)
- * Due to different categories this is an estimate based upon combining census categories.

Demographic Characteristics

Age

Comparison between the study sample and Ingham County age categories reveals that the median category for both is 45 to 54 years of age. The sample underrepresented the age group of 18 to 24 years of age. This is most likely due to having drawn the sample from a list of property owners. While few young adults have the means to own property, many older adults have made this investment. Since the study was interested in the opinions of property owners, this deviation from the population age distribution is acceptable. The other age categories for the sample are generally consistent with the population percentages.

Education

The levels of education in the sample were somewhat greater than found in Ingham County. Specifically, the sample population over represented the percentage of college graduates as are found in the general population (30.7% vs. 16.3% respectively). Furthermore, this trend continued at the post graduate level with 18.4% of the respondents possessing a post graduate degree while only 12.9 % of the population claim to be post graduates. Conversely, only 3.3% of the sample had less than high school equivalence while there was closer to 16.1 % of the people in Ingham County in this category.

There may be two reasons for having a more educated sample population. First, the Ingham County data was drawn from Census 1990 which has the most available data on people's education levels and the category percentages might have changed since that time. Still, it is doubtful that the levels seen in the sample have been attained throughout the general population. The second possible explanation is that of self-selection bias. It is

consistent with the literature that better educated people have more of an interest in environmental issues (Arcury et al., 1986, 1987) and would therefore be more likely to take the time to fill out and return the questionnaire. This may result in biases associated with the study variables that are educational in nature such as the desire for voluntary and/or information and education programs. Also, the relationships between knowledge and the other study variables of attitude, locus of control and personal responsibility may be inflated compared to the general population.

Income

The median household income for Ingham County in 1998 was \$41,743 (MIC, 1999). The 90% confidence interval surrounding the median is \$38,919 to \$44,551. Income for this year was not broken down by category and Census 1990 figures are therefore reflected in Table 6. Based upon these two sources of data, the study sample appears to under represent lower income levels while slightly over representing higher income levels. If the sample is divided at the \$40,000 level (roughly the median), then 37.5% of the sample fall below this vs. 53.0% in the general population. Comparatively, 62.5% of the study sample is above the median, while only 46.9 % of the general population is above the median. The results of this bias may be that the study sample, which has a higher disposable income than the rest of Ingham County, might be more willing to undertake best management practices requiring higher levels of public funds because they maybe more willing to incur the perceived higher taxes required to pay for these programs. More resistance to these types of programs by the general public would be consistent with placing pro-environmental behavior as a secondary issue, only to be attended to when all other concerns have been dealt with (Eden, 1993; Maslow, 1959).

Average Size of Household

The average size of the sample household is 2.2 people. The 95% confidence interval ranges from 2.1 to 2.3 people. The average household size of owner-occupied units in Ingham County is 2.6 people, which falls outside the samples confidence interval. The population generally has more people per household than reflected by the sample. This finding is consistent with having a slightly older study sample where it would be more likely that fewer children still reside at home. These results may create a similar bias as was thought to arise from having respondents with higher incomes than in the greater population. That is, the general population may have more basic needs, such as taking care of one's children, that they consider first before they think about their pro-environmental behavior. Conversely, households with children may be more inclined to consider inter-generational equity issues and support pro-environmental programs.

Number of Years One has Lived in the Area and in Their Current Home

The average years that a respondent has lived in the Sycamore Creek area was 35.3 years (SD = 19.6). The 95% confidence interval ranges from 33.7 to 36.9 years. An average respondent is likely to have resided in their current home for 17.5 years (SD = 15.3, CI: 16.3 – 18.8 years) compared to 15.5 years for homeowners in the greater Ingham County area. The fact that respondents have lived and invested in the area for significantly long periods of time is likely to influence the study results. For example, it is possible that because respondents have lived there for so long, they have developed a sense of place that compelled them to respond to the survey. Beyond simply being self-selecting, respondents' length of residence might also influence their level of knowledge about the area otherwise not found in the general Ingham County population.

Constructing the Attitudinal Clusters

The twenty fairness heuristic statements were factor analyzed (Table 7) using principle axis analysis with varimax rotation. The final solution produced five factors with eigenvalues greater than 1.0 and explained 49.3% of the variance. Based on convention, items with factor loadings greater than .40 were selected for each factor. Also, any inconsistent items (i.e. lacking face validity) were not selected. Consequently, the statement concerning “public involvement in the decision making process” was dropped by convention. And the statements on “saving waterways for the future is more important than making money now” and “long-term health of waterways should be achieved even if it reduced short-term business profit” were dropped due to lack of face validity.

The eigenvalues for the five components ranged from 1.03 to 4.19. The Cronbach alphas were somewhat less impressive with only three factors nearing the conventional minimum threshold of .60. Consequently, Factors 3 and 5 were immediately dropped due to poor internal consistency. These results were not unexpected as Syme and his colleagues (Syme & Fenton, 1993; Syme & Nancarrow, 1996, p. 1849) have noted “... general scales of beliefs about equity may be too simplistic to reflect justice beliefs.” Therefore, because of inherent difficulty of scaling equity and justice issues the researcher expected both low internal consistencies and less than eloquent factors to emerge from the analysis.

The remaining factors were reanalyzed using confirmatory factor analysis (CFA). The CFA revealed there was considerable correlation (.79) between Factors 1 and 2 (Table 8). Upon further inspection of the items contained in both factors, it became apparent that they did appear to be one construct. Based upon the results of the CFA and

Table 7: Principal Component Factor Analysis Results of 20 Heuristic Statements

Fairness Heuristic Concept		Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Q22N	Upstream is morally responsible to downstream	.638	.191	-5.2E-02	.286	-5.9E-02
Q22M	With a fair process the public should accept the decision	.611	4.1E-02	-9.4E-02	.130	1.8E-02
Q22J	Value other than dollar value	.591	.155	-6.8E-02	-.170	6.9E-02
Q22E	Polluters pay greatest share	.516	.105	-.173	-.252	.117
Q22R	Saving waterways now is more important than making money	.501	.440	-.162	-.204	-5.9E-02
Q22I	Long-term health over short-term profit	.499	.480	-3.1E-02	-.149	-.161
Q22C	Analyzing costs and benefits	4.3E-02	.668	9.3E-02	-3.3E-02	.172
Q22T	Cannot wait for exact knowledge	.163	.535	-.211	-8.1E-02	-5.5E-02
Q22B	Make personal sacrifices	.428	.523	-2.9E-02	5.4E-02	-5.9E-02
Q22F	Environment same right to water	.104	.513	-.451	-.124	.220
Q22D	Manage for overall public benefit	.416	.450	-4.1E-02	2.5E-02	.231
Q22S	Not all parts of environment are valuable	-1.1E-02	-.128	.815	-2.30E-02	.110
Q22Q	Clean waterways for environment second to people	-.235	4.8E-03	.609	.120	3.0E-02
Q22H	Pollution programs maximize local economy	.105	-1.4E-02	4.0E-02	.781	-5.2E-02
Q22L	Minimize conflict in community	.270	-.228	.341	.500	.239
Q22P	Groundwater is landowner's property	-.202	-.147	-.100	.449	.336
Q22K	Government not involved	-.295	-2.9E-02	.339	.448	-2.9E-02
Q22O	People should be compensated	-.177	9.2E-02	.112	.115	.684
Q22A	Community has a right to say	.263	.104	2.2E-02	-4.7E-02	.659
Q22G/RC	Public involvement not part of decision-making	.292	-.378	-.366	-.351	.390
Eigenvalues		4.19	1.97	1.44	1.22	1.03
Cronbach's alpha		.595	.627	.490	.508	.313
Percentage of variance explained		20.9	9.9	7.2	6.1	5.1
Cumulative variance explained		20.9	30.8	38.0	44.1	49.3
Overall mean		4.07	3.80	2.45	2.79	3.75

face validity it was decided to combine Factors 1 and 2 into one factor. This left two factors, one with nine items and the second consisting of four items.

Table 8: Correlation Matrix of the Three Factors

	Factor 1	Factor 2	Factor 4
Factor 1	1.00	.79	-.22
Factor 2	.79	1.00	-.38
Factor 4	-.22	-.38	1.00

A second CFA was run using a two-factor solution in order to determine whether there was an improvement in the Cronbach alphas as well as other tests for internal consistency. The Cronbach's alpha for Factor 1 was .73, which by convention is considered acceptable (Boster, 1999). When Factor 1 was compared to Factor 4 for parallelism it was found there was a departure from both flatness and gradient. Hence, the two factors were not measuring the same construct.

Factor 4 had a Cronbach's alpha of .50 indicating poor internal consistency. Closer inspection through the CFA analysis indicated that the model did not have a flat pattern ($X = 26.22, p = .000$) but there was a gradient ($X = 5.08, p = .406$). As mentioned above, the parallelism tests also indicated they were not measuring the same construct as Factor 1. Despite low internal consistency, Factor 4 was retained based on its eigenvalues, presence of an internal gradient and face validity.

The combination of the initial Factors 1 and 2 converges on the rights of the environment and the moral obligation to protect it. It grouped those items that focused on how to manage the process and the criteria that should be used for decision-making. This factor could be labeled MORAL IMPERATIVES. The second factor focused on many of

the notions associated with the libertarian values of minimal government intervention and the inalienability of property rights. This factor could therefore be called RESISTANCE TO CHANGE. The correlation between the two dimensions was -.33. The items contained in these scales are:

Table 9: Attitudinal Factor Items

Factor 1: MORAL IMPERATIVES	
Q22b	Everyone may have to make some personal sacrifices if we are going to have effective water resource programs.
Q22c	You cannot really solve water pollution problems by analyzing the costs and benefits in dollars.
Q22d	Everyone owns rivers and streams and therefore they should be managed for the overall public benefit.
Q22e	Those who pollute the most should pay the greatest share of clean up and protection costs.
Q22f	The environment has the same right to water as people have.
Q22j	Water has value other than its dollar value.
Q22m	Those upstream have a moral responsibility to look after the interests of those downstream.
Q22n	If the decision-making process is fair, people should accept its decisions for addressing water pollution.
Q22t	There is not time to wait for exact environmental knowledge, we need to act now.
Factor 2: RESISTANCE TO CHANGE	
Q22h	Water pollution programs should be made to maximize the overall economic income of the community.
Q22k	The government does not need to be involved in cleaning up and protecting water resources.
Q22l	If we are to clean up and protect our rivers, it should be done so as to minimize conflict in communities.
Q22p	Groundwater (water under land) is the property of the landowner above.

The two dimensions only accounted for a total of about 37.0% of the variance explained. MORAL IMPERATIVES alone accounted for 30.8% of the variance. The RESISTANCE TO CHANGE dimension explained 6.1 % of the variance.

Again, these low explanatory results were anticipated due to the interrelated nature of the concepts underlying the fairness heuristics.

The overall means of the five dimensions ranged from 2.79 to 4.07 and indicated that MORAL IMPERATIVES were somewhat important to respondents (mean is $4.07 + 3.80/2 = 3.93$) while RESISTANCE TO CHANGE was less so (mean is 2.79). However, as will be shown shortly, different clusters of people did place importance on RESISTANCE TO CHANGE.

Identification of the Clusters

Cluster analysis was applied to identify groups of respondents with similar responses to the two fairness heuristic dimensions. Initially, a ward's hierarchical clustering method was used to determine the number of clusters. Examination of the dendrogram and agglomeration coefficients suggested two clusters. This number of clusters was used a priori in a follow up non-hierarchical (K-means) cluster analysis. The results were one cluster of 320 respondents and another cluster of 279 respondents.

In order to further classify the results of the cluster analysis, t-tests and a scatter plot were used. The t-tests indicated a statistically significant difference between the two clusters for each of the two fairness heuristic dimensions (Table 10). More specifically, cluster 2 was more likely to place slightly more importance on the MORAL IMPERATIVES (mean = 4.02, SD = .453) of managing the watershed than was cluster 1 (mean = 3.82, SD = .522). Conversely, cluster 1 was more likely to resist change (mean = 3.30, SD = .409) than was Cluster 2 (mean 2.25, SD = .414). Further examination also shows there is not any overlap between the 95% confidence intervals (CI) for each factor.

Figure six depicts the relationship between the clusters in two-dimensional space. The MORAL IMPERATIVE factor is found on the x-axis while the RESISTANCE TO CHANGE factor is on the y-axis. Inspection of the cluster centers clearly shows there is a

Table 10: Means of Fairness Heuristic Factors by Clusters

Fairness Heuristic Factors	Cluster 1 (n=320)		Cluster 2 (n=279)		t-test	Sig. Level
	Mean	SD	Mean	SD		
MORAL IMPERATIVES	3.82	.522	4.02	.453	-5.10	.000*
RESISTANCE TO CHANGE	3.30	.409	2.25	.414	31.30	.000*
	95%CI = 3.76 – 3.87		95%CI = 3.97 – 4.07			
	95%CI = 3.26 – 3.35		95%CI = 2.20 – 2.29			

* Significant differences between means at the .05 level of significance

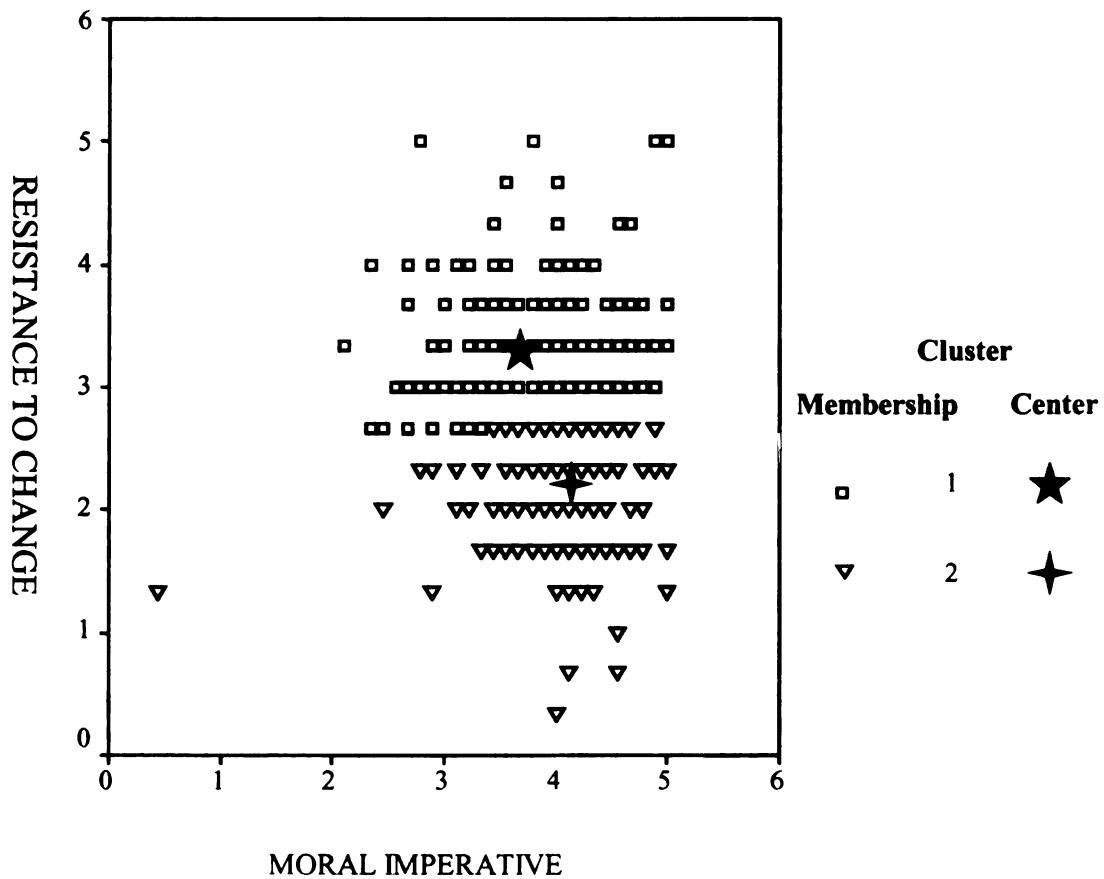


Figure 6: Cluster Membership and Centers by Factors

small (but significant) difference with regard to the MORAL IMPERATIVE factor with Cluster 2 believing that the environment has slightly more rights than do the people in Cluster 1. Regarding the RESISTANCE TO CHANGE factor, Figure six illustrates there is a significant difference between Clusters 1 and 2 with the former being more resistant to change than the latter.

Based on the means each cluster had for the two factors, the clusters can tentatively be named individualists (Cluster 1) and egalitarians (Cluster 2). These names are drawn from Dake's (1991,1992) worldview categories based on interpersonal relationships. As the analysis progresses, we will look for further evidence in terms of the grid/group nomenclature that might support these labels.

Cluster Demographics

Table 11 presents the demographic profiles of the individualist and egalitarian cluster groups. The demographic categories available for analysis were age, education, income, household size, years lived in the area and years in their current home. The two clusters were statistically different on each of the demographic variables.

The individualist cluster is significantly older than the egalitarian cluster. The mean for the individualists cluster was 45-55 years of age whereas for the egalitarian cluster it was only 35-45 years. Forty-five point five percent of the individualist respondents were older than 55 years of age while only 30.7% of the egalitarian cluster fell into this category. Examinations of the 95% confidence intervals shows there is no overlap between the cluster's mean ages and are therefore distinctly different. The t-test results and significance level at the 95% level of confidence supports these observations.

Table 11: Demographic Profiles of Cluster Groups

Table 1. Demographic Profiles of Cluster Groups					
Characteristics	Total Respondents	Individualist (n= 320)	Egalitarian (n=279)	t-test	Sig. Level
	%	%	%		
Age Categories					
Mean/Std. Dev.	4.08 SD = 1.35	4.33 SD = 1.33	3.80 SD = 1.32	4.847	.000*
(1) 18-24 years	1.0	1.0%	1.1%	95% CI CL1 4.18 – 4.48 CL2 3.64 – 3.96	
(2) 25-34 years	13.6	8.7	19.0		
(3) 35-44 years	20.4	18.7	22.3		
(4) 45-54 years	26.4	26.1	26.7		
(5) 55-64 years	18.4	18.7	17.9		
(6) 65+ years	20.2	26.8	12.8		
Education					
Mean/Std. Dev.	3.44 SD=1.07	3.22 SD=1.07	3.68 SD=1.03	-5.188	.000*
(1) < HS Grad.	3.3	4.5%	1.8%	95% CI CL1 3.10 – 3.34 CL2 3.55 – 3.80	
(2) HS or GED	17.2	21.4	12.4		
(3) Some College	30.5	34.7	25.8		
(4) College Grad	30.7	25.6	36.4		
(5) Post Grad	18.4	13.6	23.6		
Income					
Mean/Std. Dev.	6.26 SD= 2.78	6.04 SD=2.16	6.49 SD=1.97	-2.494	.013*
(1) < \$10,000	2.3%	3.3%	1.1%	95% CI CL1 5.78 – 6.30 CL2 6.25 – 6.73	
(2) \$10,000/\$14,999	2.4	3.3	1.5		
(3) \$15,000/\$19,999	3.4	3.3	3.4		
(4) \$20,000/\$29,999	12.1	13.8	10.3		
(5) \$30,000/\$39,999	17.3	19.0	15.6		
(6) \$40,000/\$49,999	16.4	14.5	18.3		
(7) \$50,000/\$59,999	14.3	12.6	16.0		
(8) \$60,000/\$69,000	10.9	12.3	9.5		
(9) \$70,000 +	20.9	17.8	24.0		
Mean/Std. Dev.	2.18 SD= 1.29	2.07 SD= 1.15	2.31 SD =1.43	-2.211	.027*
Household Size		CI ¹ 1.94 – 2.20	CI ¹ 2.14 – 2.48		
Mean/Std. Dev.	35.18 SD= 19.56	39.02 SD= 19.45	30.90 SD= 18.82	5.091	.000*
Yrs Lived in Area		CI ¹ 36.84 – 41.22	CI ¹ 28.65 – 33.14		
Mean/Std. Dev.	17.35 SD= 15.11	20.91 SD= 16.25	13.44 SD= 12.67	6.127	.000*
Yrs Current Home		CI ¹ 19.08 – 22.76	CI ¹ 11.94 – 14.94		
* Significant differences between the cluster means at the .05 level of significance					
(1) 95% confidence interval					

* Significant differences between the cluster means at the .05 level of significance

(1) 95% confidence interval

The egalitarian cluster is more educated (mean = 3.68) than the individualist cluster (mean = 3.22). Even though both of these means represent the "Some College"

category, it becomes apparent that the egalitarian cluster is significantly more educated when the "College Graduate" and "Post Graduate" categories are summed for both clusters. When this is done, it is found that a full 60% of the egalitarian cluster are at least college graduates versus only 39.2% for the individualist cluster. Again, analysis of the 95% confidence intervals shows there is no overlap between the two clusters and they are statistically different. The t-test result of -5.188 with a significance level of $.000$ at the 95% level of confidence support these findings.

The income difference between the clusters is less pronounced than the two previous demographic categories. Specifically, the mean household income for both groups was the \$40,000 to \$49,000 range, with the individualist cluster's mean being in the low \$40,000 and the egalitarian cluster's being in the mid \$40,000. Inspection of the confidence intervals reveals that indeed there is a small overlap ($.05$) at the 95% level of confidence. The higher, but still significantly different significance level of the t-test ($.013$) would also indicate that there is less variation between the cluster means.

The results on household size are similar to the findings on income. Here the mean household size for the individualist respondents was 2.07 people and 2.31 for the egalitarian respondents. The t-test results were -2.21 with a significance level of $.027$; indicating there was a statistically significant difference between the two clusters. As was expected from the t-test results, there is an overlap of $.06$ between the two 95% confidence intervals.

There was a statistical difference between the clusters for both the mean number of years lived in the area and mean number of years in their current home variables. The mean number of years for living in the area for the individualists cluster was 39.02 years,

while the mean number of years for the egalitarian respondents were almost 10 years less at 30.90 years. This pattern was mirrored in the number of years that respondents lived in their current home. In this case, the individualist group resided in their current home for an average of 20.91 years versus 13.44 for the egalitarian group. Inspection of the confidence intervals and t-test indicates the two groups are distinct with regard to these two variables that may or may not have any relevance since the residency time is relatively long for both groups.

In summary, the individualist group is older, less educated, has less household income, fewer children and resided in both their home and the area longer. Conversely, the egalitarian group is younger, better educated, has a higher household income, more children and have not resided in their homes or the area for as long. The fact that the individualists group was older and had longer residency in the area and in their home is consistent with their being more likely to resist change. With regard to the egalitarian cluster, the fact they are younger, better educated and had higher household income is consistent with their feeling more strongly about the rights of the environment (Van Liere & Dunlap, 1980; Christianson & Arcury, 1992).

Fairness Evaluations

The percentage frequency of responses to each of the twenty items on the “agreement scale” is shown in Table 12. It is noticeable that the responses to most items were skewed, indicating a high level of agreement among all respondents. Those items that exhibited the most normal distribution were "you cannot solve pollution problems by analyzing costs and benefits", "pollution programs should maximize the local economy",

Table 12: Percentage Distribution, Mean Score and Standard Deviation of Responses to Fairness Heuristic Statements

Fairness Heuristic Statements	Number of Responses	Strongly Disagree (1) %	Disagree (2) %	Neutral (3) %	Agree (4) %	Strongly Agree (5) %	Mean	Std. Dev.
Community has a right to say	597	0.2	2.3	9.9	65.00	22.6	4.08	.655
To make personal sacrifices ^{mi}	600	1.00	2.00	10.8	69.2	17.00	3.99	.670
Analyzing costs and benefits ^{mi}	593	2.9	13.7	27.0	43.7	12.8	3.50	.976
Manage for overall public benefit ^{mi}	598	1.0	5.4	12.2	59.2	22.2	3.96	.805
Polluters pay greatest share ^{mi}	600	0.0	1.3	7.2	42.5	49.0	4.39	.680
Environment has right to water ^{mi}	593	1.2	5.1	16.4	49.2	28.2	3.98	.869
Public not involved in decision	596	2.0	4.7	13.8	53.9	25.7	3.96	.874
Pollution programs maximize local economy ^{rtc}	586	5.1	22.2	39.1	29.4	4.3	3.05	.943
Long-term health vs. short-term profits	592	0.7	4.4	21.1	57.6	16.2	3.84	.766
Value other than dollar value ^{mi}	596	1.3	0.8	3.7	49.7	44.5	4.35	.717
Government not involved ^{rtc}	597	1.8	5.0	12.6	46.9	33.7	4.06	.910
Minimize conflict in community ^{rtc}	595	1.3	11.3	29.2	49.7	8.4	3.53	.851
Upstream is morally responsible to downstream ^{mi}	588	1.2	3.6	9.5	60.7	25.0	4.05	.771
Fair process the public should accept decision ^{mi}	586	0.5	4.1	14.8	70.6	9.9	3.85	.661
People should be compensated	585	2.7	15.6	45.1	32.6	3.9	3.19	.844
Groundwater is ^{rtc} landowners property	584	10.1	36.1	33.6	16.6	3.6	2.67	.985
Clean waterways for environment second to people	578	14.7	52.9	20.8	10.2	1.4	2.31	.892
Saving waterways more important than money	590	2.2	2.5	14.6	57.3	23.4	3.97	.825
Not all parts of environment are valuable	588	2.4	16.2	30.3	40.8	10.4	3.41	.957
Cannot wait for exact knowledge ^{mi}	586	2.4	12.1	28.8	43.2	13.5	3.53	.952

mi = MORAL IMPERATIVE, rtc = RESISTANCE TO CHANGE

"water management programs should minimize conflict in the community", "people should be compensated for water quality programs that hurt their livelihood", "groundwater is a landowner's property", "not all parts of the environment are valuable" and "we cannot wait for exact knowledge before we act".

Those items pertaining to "the community's right to a say on how to manage the watershed", "the polluter pay principle", "water's value other than in economic terms", and "those upstream having a moral responsibility to those down stream" tended to be highly skewed. The skewed pattern of responses for the items support Syme and Nancarrow's (1996) assertion, at least *prima facie*, that these items would cause problems in analysis based on the assumptions of univariate and multivariate normality.

Product moment correlations among the items not included in either of the two attitudinal factors were generally small (mean = 0.146, variance = 0.011) and were not significant at the .05 level. This is consistent with respondents viewing the concepts these items conveyed as being highly discriminated and generally independent of other items.

Table 13 further analyzes the results of those items of the fairness heuristic in which 80% of the respondents (in total and by cluster) either agreed or strongly agreed with the fairness statement. These items were first ranked based upon the total sample and were then again ranked based upon cluster membership. This allowed for the similarity and differences between the cluster's responses to the fairness heuristic to become more apparent.

While these statements are only a portion of the of the fairness heuristic, they reflect the general philosophies which emerged from the research. At this universal fairness level five themes emerged: (1) the value of waterways, (2) procedural justice

Table 13: Percentage of Respondents Who Agreed with and Ranked Preference for Each Fairness Heuristic Statement

	Fairness Heuristic Statement	Total Sample (608)			Cluster 1 (320)			Cluster 2 (279)		
		%	Ranking		%	Ranking		%	Ranking	
Q22j	Water has value other than its dollar value	94	1		93	1		95.3	2*	
Q22e	Those who pollute the most should pay the greatest share of clean up and protection costs	91.5	2		88	2		95	3*	
Q22a	All members of the community have a right to their say on issues involving water management	88	3		86	3		90	5	
Q22b	Everyone may have to make some personal sacrifices if we are going to have effective water resource programs	86.3	4		82	5		92	4*	
Q22m	Those upstream have a moral responsibility to look after the interests of those downstream	85.6	5		83.6	4		88.0	7	
Q22d	Everyone owns rivers and streams and therefore they should be managed for the overall public benefit	81.4	6		78.4	7		84.9	10	
Q22r	Saving waterways for the future is more important than making money now	80.7	7		73.2	8		89	6*	
Q22k	The government does not need to be involved in cleaning up and protecting water resources	80.6	8		65.3	11		98	1*	
Q22n	If the decision-making process is fair, people should accept its decision for addressing water pollution	80.4	9		80	6		81	12	
Q22g	Public involvement should not be part of the decision-making process for managing water resources	79.5	10		73	9		87.3	8*	
Q22f	The environment has the same right to water as people have	77.4	11		69	10		87	9*	
Q22i	The long-term environmental health of local waterways should be achieved even if it reduces short-term profits	74	12		65.1	12		84	11*	

* Clusters are statistically different from one another at the .05 significance level

considerations, (3) distributional justice consideration, (4) environmental and human rights and (5) governmental involvement.

The number one ranked item by all respondents was “water has value other than its dollar value”. Other items that could be included in how respondents valued their waterways are Q22e, Q22r and Q22i. These items were ranked second, seventh and twelfth respectively. Taken as a group, these items focus on the trade off between the environment and the economy and how programs should be funded. There was strong support at the sample level for the polluter pays principle.

Procedural justice considerations appeared third in the ranking by the entire sample. The statement “all members have a right to their say on issues involving water management” was agreed with by 88% of all respondents. Other items relating to procedural justice were Q22n and Q22g, ranked ninth and tenth respectively. These items as a whole spoke to the right to have voice, public involvement and a fair process.

The third theme to emerge concerned itself with distributional justice considerations. There were two items relating to this theme: (Q22b) “everyone may have to make some personal sacrifices if we are going to have effective water resource programs” and (Q22d) “everyone owns rivers and streams and therefore they should be managed for the overall public benefit”. The former speaks to the distribution of costs, while the latter speaks to the distribution of benefits.

Question 22m on the moral responsibility to look after your neighbors downstream (Q22m) (ranked as the fifth item by the entire sample), and the “environment having the same right to water as people have” (Q22f), constitutes a rights based theme.

Question 22m reflects human rights while Q22f concerned itself with environmental rights.

The last theme to be considered important by all respondents was governmental involvement (Q22k). It was ranked eighth by all respondents.

There were five of the twelve fairness heuristic items that appeared in the Australian water allocation study "top eight" rankings (Syme et al., 1999). At the universal fairness level, the Australian studies had ongoing support for the community's rights to have a voice in the allocation decisions, the rights of the environment and having appropriate outcomes of procedural justice (Syme et al., 1999). Some of the similarities include an emphasis on the environment's right to water with two of the Australian studies having about 78% - 81% of respondents supporting this notion, a similar result to this study's findings. Another similarity between the studies was the weight placed on accepting the decisions made by a fair process. In the Australian studies support for these concepts ranged from 64% - 83%, while this study found 80% - 81% support. In terms of the differences between the two countries, those items contained in both studies that specifically traded off economic prosperity with environmental health appeared in this study's ranking, but not in the Australian standings.

Comparison Between Individualist and Egalitarian Cluster's Fairness Evaluations

There are statistically significant differences between how the two clusters of respondents, individualists and egalitarian, ranked these fairness heuristic items. The most glaring difference between the groups is their views on governmental involvement. While the egalitarian cluster ranked this item (Q22K) number one, the individualist cluster ranked it eleventh. This finding is consistent with the individualist view that

deregulation is a rational management strategy because they view nature as being benign. Also, individualists have a low group orientation and believe value decisions stem from personal judgments rather than collective control (Rayner, 1988a) as might be represented by governmental involvement. Conversely, egalitarians might see governmental involvement as being able to help foster the equality of outcomes (Rayner, 1988b). It is also consistent with their high group philosophy (i.e. everyone should be involved).

The differences between the cluster rankings on other fairness heuristic items would seem to support these findings. For instance, there were statistically significant differences between clusters on the items in the value of waterways theme. Most telling were items Q22r and Q22i that directly pitted environmental protection of our waterways against economic profit. In both these questions, the individualists were considerably less willing to forgo economic gain for the sake of a cleaner environment. Specifically, on the “saving waterways for the future being more important than making money” item only 73.2% were in agreement. And on the “long-term health of local waterways should be achieved even if it reduces short-term profits” item only 65.1% were in agreement. The egalitarians were 89% and 84% in agreement with these items respectively. The two clusters also differed on their level of agreement about “water having a value other than its dollar value” (Q22j) and the polluter pays principle (Q22e) but considerably less than the items just mentioned. Despite these apparent differences, two-thirds to three-quarters of the sample population are in agreement about these fairness heuristic concepts.

The two clusters also differ significantly ($t = -4.638, p = .000$) on whether public involvement should be part of the decision making process. The individualist cluster does

not agree as strongly (73%) as the egalitarian group (87.3%) that the public should be involved. This is particularly interesting since both clusters do not differ (statistically) on “people’s right to have their say” (Q22a) and “accepting the decision of a fair process” (Q22n).

The item on everyone having to make “personal sacrifices in order to have effective water resource program” (Q22b) was less supported by the individualist cluster (82%) than the egalitarian cluster (92%). This is consistent with individualists being less willing to forgo income to protect their waterways as discussed earlier.

The last item on which the two clusters differ is on the “environments right to water being the same as people’s rights”. Seventy-three percent of the individualists agreed with this statement versus 87% by egalitarians.

In summary, the two clusters were in agreement about water having a value other than its dollar value and the polluter pays principle. The items that they differed on supported our initial labeling of the clusters as individualist and egalitarian. That is, the individualist responses to the fairness heuristic items clearly demonstrated they favored less government involvement, were less willing to forgo economic gains for a cleaner environment, believed in the public’s right to voice their opinions but were less willing to be involved in decision making and placed people’s rights over that of the environment relative to their egalitarian counterparts. On the other hand, the egalitarian cluster was in favor of government involvement, were more willing to forgo economic gain for a cleaner environment, believed fair decision making processes involved the public and their right to voice themselves, and awarded the environment a higher level of rights, all relative to the individualist cluster. More importantly, despite the differences in the

degree of support indicated by the respective clusters, more than two-thirds to three-quarters of the sample population was in agreement with the concepts presented by each of the fairness heuristic items. These similarities can provide the basis for designing future deliberative planning processes.

Relationships Between Knowledge, Locus of Control and Personal Responsibility and the Individualist and Egalitarian Clusters

If one thinks about the variables of knowledge, locus of control and personal responsibility in the context of the individualist and egalitarian clusters, one might be able to deduce what relationships might exist. For example, it would not be surprising if the data revealed that the individualist cluster was higher on locus of control than their egalitarian counterparts. This is because individualists value decisions stemming from personal judgments (Rayner, 1988a) and defend their freedom to bid and bargain in self-regulated networks (Thompson, 1992). In other words, they desire to be in control of their surroundings.

Regarding personal responsibility, the egalitarian cluster is probably more likely to assume more personal responsibility for the environment than the individualist cluster. There are two reasons for this assertion: (1) egalitarians are thought to frame natural resource issues in ethical terms because it allows them to focus on the social and political dimensions and to criticize the institutions responsible for resource management (i.e. an “if I don’t take responsibility who will” attitude) (Dake, 1992) and (2) because individualists view nature as being benign, therefore not needing their attention.

In terms of knowledge, there is little in the literature to guide us as to how this variable may relate to the two clusters. It could be argued that if egalitarians have more personal responsibility, then they are more likely to have more knowledge because the

latter is thought to be a pre-requisite for the former (Hines et al., 1986). Also, the previous demographic results indicating that the egalitarian cluster was more educated than the individualist cluster suggest this might be the case. Table 14 reports the differences between cluster means for the four psychological study variables.

Table 14: Comparison of Study Variables by Attitudinal Groups

	Total Responses		Individualists		Egalitarian		t-test for Equality of Means		
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	t-test	df	Sig. (2-tailed)
KNOWISS	2.56	1.45	2.50	1.46	2.66	1.44	-1.399	597	.162
1 = no knowledge of issues 5 = knowledgeable of issues			CI ¹ 2.33 – 2.66		CI ¹ 2.50 – 2.83				
KNOWACT	3.07	1.59	2.92	1.61	3.28	1.54	-2.806	582	.005*
1 = no knowledge of actions 5 = knowledgeable of actions			CI ¹ 2.73 – 3.10		CI ¹ 3.10 – 3.47				
LOC	3.64	.593	3.57	0.64	3.73	0.51	-3.367	597	.001*
1 = low perceived internal LOC 5 = high perceived internal LOC			CI ¹ 3.50 – 3.64		CI ¹ 3.67 – 3.79				
PERSONAL	3.75	.597	3.63	0.60	3.88	0.57	-5.257	597	.000*
1 = low personal responsibility 5 = high personal responsibility			CI ¹ 3.56 – 3.69		CI ¹ 3.81 – 3.95				

* Clusters are statistically different from one another at the .05 significance level

¹ 95% confidence interval

Environmental Knowledge

The mean score for knowledge of the issue (KNOWISS) was 2.56 (SD = 1.45) with a minimum of one and a maximum of five. The mean score for the individualist cluster was 2.50 (SD = 1.46) and for the egalitarian cluster it was 2.66 (SD = 1.44). An independent groups t-test revealed there was no difference between the two cluster

groups with regard to their knowledge of the issues. The overlap between the clusters' 95% confidence intervals confirms that there is little difference between the groups.

The mean score for knowledge of action strategies (KNOWACT) was 3.07 (SD = 1.59) also with a minimum of one and maximum of five. The individualist's mean score was 2.92 (SD = 1.61) while the egalitarian's mean score was 3.28 (SD = 1.54). The individual group t-test indicated there was a statistically significant difference between the two clusters with the egalitarian group having more knowledge of action strategies. Inspection of the 95% confidence intervals shows there is no overlap between the two clusters and it can therefore be concluded the two groups do differ on this variable.

Locus of Control

The mean score on the locus of control (LOC) variable was 3.74 (SD = .89) ranging from a low of one to a high of five. The individualist cluster's mean was 3.60 (SD = 0.67) while the egalitarian cluster's score was 3.83 (SD = 0.81). The t-test for differences between groups indicated there was a difference and that the egalitarian cluster had a higher sense of locus of control than did their individualist counter parts. There was not a common range between the two confidence intervals. This is contrary to the anticipated results discussed previously, but lends support to Eden's (1993) view that a person's sense of environmental responsibility and efficacy are interdependent on how they influence pro-environmental behavior.

Personal Responsibility

The mean personal responsibility (PERSONAL) score was 3.91 (SD = 1.02) with a minimum of one and a maximum of five. Again, we see the egalitarian cluster as having

a larger mean score of 3.99 (SD = 0.78) than the individualist cluster's mean of 3.75 (SD = 0.96). The individual group t-test indicated these to be two distinct groups as was shown by the separate confidence interval ranges. The result that the egalitarian cluster was higher on this variable was as anticipated and helps explain the LOC results.

Summary

The analysis of the data indicated that the egalitarian cluster was more knowledgeable about action strategies, believed it was in their power to make a difference (higher internal LOC), and assumed more personal responsibility for the management of local waterways relative to their individualist counterparts. Therefore, egalitarians were higher on all the psychological variables. This was almost what had been predicted, but originally it was thought that the individualist cluster would be higher on LOC, than the egalitarian cluster. A possible explanation for this finding is Eden's (1993) observation that it seems meaningless to ascribe oneself responsibility for something one has no control over.

The Individualist and Egalitarian Clusters and the Intention to Act

Analysis of the data so far supports there being two distinct clusters of individuals in the study population with regard to their worldviews surrounding the management of the Sycamore Creek watershed. One significant question that remains to be answered is if these differing worldviews result in different intentions towards implementing best management practices. Table 15 presents how the study sample population and each of the clusters ranked the seven best management practices.

Table 15: Percentage of Respondents Who Support and Ranked Preference for Each of the Best Management Practice Options

		Total Sample (N=608)		Individualists (N=320)		Egalitarians (N=279)	
		%	Ranking	%	Ranking	%	Ranking
Q20d	Fines for polluting	86.6	1	82.2	1	94.3	1*
Q20e	Increased enforcement of environmental regulations	80.9	2	72.9	5	92.8	2*
Q20f	Public information and education programs	80.1	3.5	76.9	3	86.4	4*
Q20g	Voluntary programs to help landowners adopt environmentally friendly practices	80.1	3.5	79.4	2	83.8	5*
Q20c	Stricter regulations on activities that impact waterways during development	78.7	4	73.1	4	87.8	3*
Q20a	Zoning requirements for some open space to be preserved on undeveloped land	71.0	5	64.3	6	81.0	6*
Q20b	Subsidies to landowners for environmentally friendly practices	54.9	6	50.6	7	61.6	7*

* Significant difference between means of the cluster at the .01 level.

When an independent group t-test was run between the cluster groups on the INTENT1 variable (i.e. the sum of all the BMP scores) there was a significant difference ($t = -6.820, p = .000$). In order to further analyze the BMP options, the percentage support for each option (would support and strongly support) was calculated and then each was ranked against one another.

As a group, the respondents ranked fines for polluting as the number one BMP option, followed by increased enforcement of regulations. There was a tie for the third option between public information and education and voluntary programs. Stricter regulations were fourth, followed by the zoning of open spaces and lastly subsidies. The

fact that fines for polluting was ranked first by both clusters again reflect the polluter pays principle so prevalent in the results of the analysis of the fairness heuristic.

The two clusters began to diverge after this initial agreement in terms of the types of programs they favored. The individualist cluster ranked both voluntary and public information programs as their second and third options respectively. They also gave lower rankings to increased enforcement (fifth) and stricter regulations (fourth). The egalitarian cluster was consistent in their desire for fines, increased enforcement and stricter regulation, ranking them first, second and third respectively.

Neither cluster indicated a preference for the zoning of open space nor subsidies and they were consistently ranked last. Subsidies were the most negatively received option with 8.7 % of the respondents indicated they would not support this option.

The individualist cluster consistently had a lower percentage of respondents who would indicate their support on all the items. All the differences in the rankings by the clusters were found to be statistically different by independent group t-tests. The “Do Not Know” category never exceeded 10% of the responses both for the entire sample population and by cluster. Again despite the differences between the groups, five of the six BMP options received between two-third to three-quarters of the sample population’s support for implementation.

Correlations Between Study Variables

The seven study variables analyzed in this section are knowledge of the issues (KNOWISS), knowledge of action strategies (KNOWACT), the attitudes of moral imperatives (MORAL), and resistance to change (RESIST1) that should be negatively correlated with the other variables, locus of control (LOC), personal responsibility

(PERSONAL) and intention to act (INTENT1). Pearson Correlation analysis was conducted to explore the relationships among the variables (Table 16).

Table 16: Pearson Correlations (N = 608) Between Study Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) KNOWISS	1						
(2) KNOWACT	.394**	1					
(3) MORAL	.146	.132**	1				
(4) RESIST1	-.076	-.079	-.127**	1			
(5) LOC	.111**	.058	.370**	-.090*	1		
(6) PERSONAL	.158**	.134**	.383**	-.189**	.460**	1	
(7) INTENT1	.091*	.066	.414**	-.260**	.449**	.364**	1

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

The intention to support BMP implementation scores correlated significantly ($p < .01$) with (in order of importance) LOC, MORAL, PERSONAL and RESIST1. Intuitively one would think that there would be a significant relationship between having knowledge and the intention to act, yet surprisingly there was not at the .01 level. Several other significant relationships were also found. KNOWISS was found to correlate with KNOWACT, MORAL, LOC and PERSONAL. Relationships were found between KNOWACT and the MORAL and PERSONAL variables. MORAL was found to correlate negatively with RESIST1 and positively with LOC and PERSONAL. The RESIST1 attitudinal measure exhibited a negative relationship with PERSONAL. And lastly, LOC was positively correlated with PERSONAL. The magnitudes of the relationships are generally consistent with those studies reported in Table 4 at the end of Chapter II. Nevertheless when certain variables were controlled for, many of these relationships were no longer significant.

Table 17 presents the partial correlation coefficients, significance levels and the controlled for variables. It can be seen amongst the antecedent variables to intention to act, the strongest relationships were between KNOWISS and KNOWACT, MORAL and



Table 17: Partial Correlations Coefficients

Variables	Coefficients	Variables Controlled For
KNOWISS - KNOWACT	.374 p = .000	MORAL, RESIST1, LOC, PERSONAL
KNOWISS – MORAL	.034 p = .423	KNOWACT, RESIST1, LOC, PERSONAL
KNOWISS – LOC	.037 p = .379	KNOWACT, MORAL, RESIST1, PERSONAL
KNOWISS – PERSONAL	.062 p = .141	KNOWACT, MORAL, RESIST1, LOC
KNOWISS – RESIST1	-.017 p = .690	KNOWISS, MORAL, LOC, PERSONAL
KNOWACT - MORAL	.049 p = .238	KNOWISS, RESIST1, LOC, PERSONAL
KNOWACT – RESIST1	-.054 p = .203	KNOWISS, MORAL, LOC, PERSONAL
KNOWACT – LOC	-.026 p = .540	KNOWISS, MORAL, RESIST1, PERSONAL
KNOWACT – PERSONAL	.067 p = .112	KNOWISS, MORAL, RESIST1, LOC
MORAL – RESIST1	-.049 p = .240	KNOWISS, KNOWACT, LOC, PERSONAL
MORAL – LOC	.231 p = .000	KNOWISS, KNOWACT, RESIST1, PERSONAL
MORAL – PERSONAL	.233 p = .000	KNOWISS, KNOWACT, RESIST1, LOC
RESIST1 – PERSONAL	-.149 p = .000	KNOWISS, KNOWACT, MORAL, LOC
RESIST1 – LOC	.088 p = .037	KNOWISS, KNOWACT, MORAL, PERSONAL
LOC – PERSONAL	.367 p = .000	KNOWISS, KNOWACT, MORAL, RESIST1
KNOWISS – INTENT1	.010 p = .818	KNOWACT, MORAL, RESIST1, LOC, PERSONAL
KNOWACT – INTENT1	-.007 p = .867	KNOWISS, MORAL, RESIST1, LOC, PERSONAL
MORAL – INTENT1	.268 p = .000	KNOWISS, KNOWACT, RESIST1, LOC, PERSONAL
RESIST1 – INTENT1	-.214 p = .000	KNOWISS, KNOWACT, MORAL, LOC, PERSONAL
LOC – INTENT1	.297 p = .000	KNOWISS, KNOWACT, MORAL, RESIST1, PERSONAL
PERSONAL – INTENT1	.120 p = .004	KNOWISS, KNOWACT, MORAL, RESIST1, LOC

LOC, MORAL and PERSONAL, RESIST1 and PERSONAL, RESIST1 and LOC, and between LOC and PERSONAL. Regarding the intention to act variable (INTENT1), it can be seen that MORAL, RESIST1, LOC and PERSONAL were all significant.

The difference between the partial correlation that controlled for all other study variables and the Pearson Correlation on the relationship between KNOWISS and KNOWACT was only .022. This insignificant difference between the results suggests that these two measures of knowledge may not be as distinct as had originally been intended. Therefore, these two measures will be summed together to create one variable for use in the forth-coming regression analysis.

The attitudinal variables of MORAL and RESIST1 along with the other psychological variables of LOC and PERSONAL interacted as was anticipated through a review of the literature. Specifically, the following can be said about these relationships: (1) the relationship between the two attitudinal variables of MORAL and RESIST1 were not significant in the partial correlation, (2) three of the correlations, MORAL – LOC, MORAL – PERSONAL and RESIST1 – PERSONAL were all substantially lower in the partial correlation analysis and (3) the LOC – PERSONAL relationship remained relatively strong in the partial correlation analysis. These observations would seem to indicate a high level of interrelatedness between the psychological variables used in the study. The MORAL attitudinal factor was clearly viewed by respondents as being similar to both the LOC and PERSONAL (responsibility) scales. The most robust relationship was between locus of control and personal responsibility (.367, $p = .000$).

When each of the variables was correlated with the overall intention to support best management practices while controlling for all the other variables, it was again

found that the relationships were weaker than in the Pearson Correlation. The variable most resistant to change in the partial correlation was RESIST1 while the most significant variable to change was PERSONAL.

Variables Having the Greatest Influence on the Intention to Act

Multiple regression (OLS) analysis was used to assess the independent effects of specific variables on individual intention to support BMPs designed to improve water quality. For the independent variable assessing cluster membership, a dummy variable was constructed for use in the regression analysis.

Table 18 presents the mean and standard deviation of each variable, their Beta weights, t-tests and significance levels. The *F*- test results indicate the model is statistically significant. For the various demographic variables included in the model, it was found that people with higher levels of education were more likely to support the implementation of BMPs. The remaining variables of age, income, length of residency in the area and in their current home were not found to be significant.

The knowledge of issues and action strategies variables were also not significant. This is consistent with other studies that have found that knowledge has a weak relationship with either attitudes or intentions (McFarlane & Boxall, 2000).

The next sets of variables included in the model were the psychological measures. This included the GROUP variable that encompassed the two attitudinal factors of moral imperatives and resistance to change and the other psychological variables of locus of control and personal responsibility.

All three of the variables had the expected effect on the intention to support BMP implementation and were statistically significant. Memberships in the egalitarian cluster

Table 18: Multiple Regression Estimates for the Intention to Support BMP Implementation

		Mean	Std. Dev.	Beta	t-test	Sig. Level
KNOWALL	Knowledge of Issues & Action Strategies 1 – no knowledge 5 – knowledgeable	2.78	.954	-.009	-.227	.821
LOC	Locus of Control 1 – low internal control 5 – high internal control	3.66	.589	.355	8.310	.000*
PERSONAL	Personal Responsibility 1 – low sense of personal responsibility 5 – high sense of personal responsibility	3.77	.608	.179	4.070	.000*
GROUP	Cluster Membership 0 – individualists 1 – egalitarians	.502	.500	.137	3.426	.001*
AREA	Length of Residency in Area continuous	33.89	18.96	-.038	-.686	.493
HOME	Length of Residency in Current House continuous	16.05	13.93	-.060	1.111	.267
AGE	Age of Respondent 1 – 18 - 24 4 – 45 - 54 6 – 65 years of age and up	4.02	1.32	-.026	-.492	.623
EDUC	Education Level 1 – less than high school 3 – some college 5 – post graduate degree	3.48	1.05	.094	2.090	.037*
INCOME	Household Income 1 – less than \$10,000/year 6 - \$40,000 – \$49,000/year 9 – \$70,000+/year	6.24	2.05	.002	.059	.953
INTENT	Intent to Support BMPs Options 1 – would not support 3 – would support 4 – would strongly support	3.23	.538			

* Significant at the .05 level

Adjusted $R = .557$
 $R^2 = .310$
 $R^2 = .297$
 $F = 24.272$
 $p = .000$

would have a greater propensity towards supporting the implementation of BMPs than would being in the individualist cluster. The locus of control indicator was found to be

the strongest predictor of whether an individual will support BMPs or not. For the final indicator in this set of variables, personal responsibility, it was found that if a person felt responsible for the health of local waterways then they were more likely to support the implementation of BMP, although this was the weakest predictor of the significant variables.

The model had an R of .557 and an adjusted R^2 of .31. These figures, although below the range that Sutton (1998) reported in his meta-analysis, still provide support for the argument that environmental intention to act is primarily influenced by the psychological underpinnings of worldviews. The psychological indicators were the most important determinants of the intention to support implementing BMPs. Not only do all the indicators have significant effects on the intention to support in the model, but the largest standardized regression coefficients was locus of control ($B = .355$).

When the sample was subdivided by the clusters and the regression model applied, there is only a small difference in the model's predictability (Table 19). Specifically, the model better predicts the individualist cluster ($R = .563$) than it does the egalitarian cluster ($R = .555$) and with fewer variables. The models for both clusters were significant with the F – test for individualists being 14.3444 ($p = .000$) and for egalitarians it was 11.926 ($p = .000$).

In order of importance, the variables of LOC, MORAL and RESIST are the significant predictors of an individualist member's intention to support the implementation of BMPs. For egalitarians the significant predictor variables, in order of importance are LOC, MORAL, EDUC and PERSONAL. Note that there are differences in the list of variables that are effective in predicting the intention to act for each cluster.

Table 19: By Cluster Regression Estimates for the Intention to Support BMP Implementation

		Individualist	Beta	Egalitarian	Beta
		b		b	
KNOWALL	Knowledge of Issues & Action Strategies	-.039	-.067	-.009	-.019
	1 – no knowledge				
	5 – knowledgeable				
MORAL	Moral Imperatives	.352	.322^a	.259	.245^a
	0 – Low moral priority				
	5 – high moral priority				
RESIST1	Resistance to Change	-.172	.068^c	.020	-.017
	0 – low resistance to change				
	5 – high resistance to change				
LOC	Locus of Control	.290	.324^a	.256	.272^a
	1 – low internal control				
	5 – high internal control				
PERSONAL	Personal Responsibility	.001	.018	.104	.122^c
	1 – low sense of personal responsibility				
	5 – high sense of personal responsibility				
AREA	Length of Residency in Area	-.000	-.026	.000	.000
	continuous				
HOME	Length of Residency in Current House	.000	.026	.002	-.057
	continuous				
AGE	Age of Respondent	.000	-.127	-.025	-.067
	1 – 18 - 24				
	4 – 45 - 54				
	6 – 65 years of age and up				
EDUC	Education Level	.030	.042	.009	.198^b
	1 – less than high school				
	3 – some college				
	5 – post graduate degree				
INCOME	Household Income	.000	.003	.003	.014
	1 – less than \$10,000/year				
	6 - \$40,000 – \$49,000				
	9 – \$70,000+/year				
		<i>R</i> = .563		<i>R</i> = .555	
		<i>R</i> ² = .317		<i>R</i> ² = .308	
Adjusted		<i>R</i> ² = .295		<i>R</i> ² = .282	
		<i>F</i> = 14.344		<i>F</i> = 11.926	
		<i>p</i> = .000		<i>p</i> = .000	

a: Difference Between the Clusters is Significant at the .001 level

b: Difference Between the Clusters is Significant at the .01 level

c: Difference Between the Clusters is Significant at the .05 level

There are also similarities in that the variables of LOC and MORAL are common to both clusters. Both LOC and MORAL beta weights are stronger for individualists than for

egalitarians. These findings suggest that the clusters do indeed think differently about their watershed and by extension, how it should be managed.

Non-Response Results

To examine the somewhat low response rate, twenty phone contacts were made to determine why the surveys were not completed and returned. The most common reason for non-response was that the individual was “too busy.” Four respondents were no longer at that mailing address. Three people felt they were too old to participate. Two respondents indicated they did not know enough to participate and the remainder of the people did not respond for various other reasons. Not knowing enough about watershed issues to adequately answer the survey was also one of the reasons given for refusal when trying to recruit participants for pre-testing.

Study Limitations

Before advancing to the conclusions of this study, there are several limitations that should be acknowledged. It is important to address these limitations to fully understand the conclusions and recommendations that have come about as a result of this research.

First, the study chose to use the fairness heuristic in order to capture the interaction between respondent attitudes and fairness judgments. Although use of this instrument enriched the analysis in terms of respondent worldviews, it weakened the subsequent analysis between attitudes and the other psychological study variables. That is, the attitudinal factors obtained were less defined than one might like, although they

still met normal conventions. Also, there was some collinearity between the other study variables but this is often the case in psychological studies.

Second, personal responsibility was used as a proxy for the social norm variable in the theory of planned behavior. Although personal responsibility is a social norm (Geller, 1995; Guagnano, 1995; Schwartz, 1970, 1977) it may be that it is too narrow a construct to adequately capture the nuances that Ajzen and Fishbein (1977) envisioned the construct to mean. Furthermore there was some collinearity with the other study variables of moral imperatives and LOC.

Another limitation of the study was the ability to capture the situational factors surrounding the implementation of best management practices. The details associated with BMPs such as size and location if it is a structural BMP or the type of payment vehicle for both structural and non-structural BMPs was not reflected in the questionnaire. This means that a respondent's intention to support the implementation of a BMP may change once they are in possession of all the facts. Resource managers need to be aware of the potential impact of these details and not rely solely on the conclusions drawn by this study.

Finally, the actual watershed used in the study, Sycamore Creek, has been the site for state extension programs since the late 1980s. The previous efforts to inform and educate the public may have influenced respondent knowledge, attitudes, locus of control and their sense of personal responsibility that in turn influenced their intention to support BMP implementation. Managers from other watersheds reading these conclusions and recommendations need to recognize that each watershed is unique and not simply assume it will be the same in their watershed.

CHAPTER V:

CONCLUSIONS, DISCUSSION AND RECOMMENDATIONS

Conclusions and Discussion

There has been a limited amount of research using psychological analysis to predict future behavioral intentions towards watershed management programs. This study sought to take one psychological research instrument (the fairness heuristic) and one psychological theory (the theory of planned behavior) and apply them in the context of watershed best management practices.

The study set out to determine groups of people who held similar worldviews on how to manage their watershed. Analysis of respondents discovered two attitudinal factors, MORAL IMPERATIVES and RESISTANCE TO CHANGE. Using these two factors, respondents were clustered into two groups, *individualists* and *egalitarian*, borrowing from Dake's (1991, 1992) worldview typology. The analysis further defined the characteristics of these groups in terms of demographics, fairness evaluations and psychological variables. When the groups were broken down by these variables and interpreted through the lens of grid/group nomenclature, it was concluded that the worldviews represented by these names indeed fit the respondent groups. The last stage of the analysis sought to determine if the two groups of respondents differed in their support for implementing BMPs and what study variables best predicted their support. It was concluded that they did differ on both the level of their support and the types of programs preferred. Also, the clusters used different study variables in making these determinations.

The use of the fairness heuristic and the theory of planned behavior were used to examine the effects of psychological variables on the intention to support BMP implementation. The use of these different instruments helped to reinforce the difficulty of separating the procedural justice aspects of decision-making from those associated with attitudes and outcomes (Folger, 1996; Syme et al., 1999). Still, the combination of these approaches yielded many important findings. These discoveries are discussed below.

Exploratory factor analysis of the fairness heuristic yielded two attitudes held by respondents in terms of managing their watershed. These were labeled MORAL IMPERATIVES and RESISTANCE TO CHANGE. The former factor seemed similar to the findings that people believe in the “rights of the environment” found in the Australian water allocation studies (Syme et al., 1999). This bodes well for resource managers in that they can focus on those similarities when working with the community to formulate policy. Regarding the resistance to change factor, it seemed to indicate a desire for minimal government and the inalienability of property rights both of which are tenants of libertarian doctrine (Wenz, 1988). Again, this might help resource managers when they are working with the community. If the population is in agreement about desired outcomes (i.e. clean water) then it is only the ways in which to achieve this that are contentious. Knowing there is a large portion of the population who will be resistant to certain types of change, the manager can then suggest offering a suite of implementation options aimed at cleaning up waterways. Concerning the other items in the fairness heuristic, they were only modestly correlated which suggests that people think about these items somewhat independently.

The cluster analysis based upon these two attitudes showed two clusters existed in the study population. These were labeled individualist and egalitarian. The individualist and egalitarian groups of respondents were relatively close in terms of their MORAL IMPERATIVES attitude. This is encouraging because it suggests that people generally agree on a common set of ethical principles upon which to decide how to manage their watershed (Seligman et al., 1994). The two groups were not as close in their attitude of RESISTANCE TO CHANGE, with the individualist group indicating they were more resistant than their egalitarian counterparts. If one assumes that part of a person's resistance to change is somewhat related to "fear of the unknown", then the implications of this finding for the watershed manager is a need to anticipate the consequences of proposed programs and communicate these effectively to watershed residents. Furthermore, it can be anticipated that a portion of the population will support programs that have the least impact on themselves, regardless of program effectiveness.

In order to further understand and confirm the worldviews held by the two groups of respondents, the study variables were analyzed at both the sample population level and at the cluster level. These yielded numerous interesting results beginning with the demographic profiles. Beginning at the sample population level, it was shown that the sample had obtained higher levels of education, earned slightly more money and had fewer children than did the general population of homeowners in Ingham County. Based on previous research stating that young, educated liberals were more likely to possess pro-environmental attitudes, (Arcury & Johnson, 1987; Arcury et al., 1986; Christianson & Arcury, 1992) we might wish to conclude that selection bias is an issue for the study.

Fortunately, subsequent analysis of the groups revealed substantial differences in responses suggesting that this effect was minimal.

The individualist cluster was found to be older, less educated, have a lower household income, fewer children and resided in the area and their home longer. Relative to these findings, it was shown that the egalitarian cluster was younger, more educated, had a higher household income and resided in the area and their home for shorter periods of time. The multiple regression analysis indicated that of these variables, only the level of education for egalitarians was a significant predictor of the intent to support BMP implementation.

There are two conclusions to be drawn from these findings on demographic variables: (1) the profiles of each group may help a watershed manager identify which group an individual or group of individuals is likely to be associated with, but that (2) the results only partially supported previous research suggesting that younger, more educated, urban dwelling liberals are more likely to engage in pro-environmental behavior (Arcury & Johnson, 1987; Arcury et al., 1986; Christianson & Arcury, 1992). Therefore, demographic variables may only be useful in helping to identify individuals who possess similar worldviews and the type of interventions to use.

Those fairness heuristic items in which there appeared to be the greatest variability in the population sample related to human use. There was a significant spread in thoughts about water and water pollution in an economic context. In general, most people were neutral on whether people should receive compensation for programs that hurt an individual's livelihood, but were more variable about using programs to maximize the local economy. Furthermore, this variability carried over into using

cost/benefit analysis to solve water pollution problems and to trading off different parts of the environment for human use. The variability of these items suggests that respondents were unsure about viewing water resources in economic terms and that there may be other considerations that entered their reasoning.

The most highly skewed responses involved moral obligations (to those downstream), community voice, non-economic value and distributive justice. The strong desire by respondents to adhere to these concepts when managing the watershed seems to indicate they held a rights based viewpoint, as is associated with a universal value orientation (Axelrod, 1994). This has immediate implications for water pollution trading programs. If the public has the perception of clean water as a right, then they may not be receptive to economic programs, especially if the programs are not understood. At the very least, it can be anticipated that there will be conflict between environmental rights and other constitutional or legal rights (Montada & Kals, 2000).

From this point forward in the analysis, the grid/group nomenclature associated with Dake's (1991,1992) worldviews was used as a lens for interpretation. Specifically, the social relations surrounding individualists are hypothesized to hold the myth of nature as benign so that if people are released from artificial constraints there will be few limits to abundance for all with surplus to provide compensation for any hazards created in the process (Dake, 1992). Deregulation is the rational management strategy in this low-grid/low-group culture because individualists value decisions stemming from personal judgments rather than collective control (Rayner, 1988a). The term individual in this context refers to social beings generating and stabilizing a form of social relations and institutions that defend their freedom to bid and bargain in self-regulated networks with

few prescriptions (Dake, 1992). On the other hand, egalitarian groups are those with strong group boundaries (high group), but with prescriptions that do not vary by rank and station (Dake, 1992). They believe the myth that nature is fragile and because they view nature as being ephemeral it justifies their precautionary approach to management. The egalitarian group prefers approaches to management that foster equity of outcomes (Rayner, 1988b) and are hypothesized to frame natural resource issues in ethical terms. When egalitarian social relations prevail, they are often critical of the institutions responsible for natural resource management and in the extreme form can be strict preservationists (Dake, 1992). The data analysis findings did support that the two study clusters fit these social patterns and the findings will be subsequently discussed. It should be noted that measures of a worldview are related to personality traits and personal values as well as to social attitudes and policy preferences and as such are not meant to be mutually exclusive categories.

Ranking the responses to the fairness heuristic at both the sample population and cluster levels was the next step in the analysis. Consistent with the highly skewed responses, the number one ranked item by the sample population was that “water has a value other than its dollar value.” The individualist cluster also ranked this item first while the egalitarian cluster ranked it second. Question 22f directly asked respondents to consider whether the environment has the same rights to water as people; it was ranked ninth by the egalitarian cluster and tenth by the individualist cluster. Therefore, the same conclusion that was already made about respondents awarding the environment at least some rights can be drawn.

Either the second or third ranked item by all respondents was the desire for polluter pay programs. This stated preference indicates the public operates in a command and control management paradigm and wish to internalize the externalities of pollution. The limitations of command and control programs have been well documented (Montada & Kals, 2000; Tenbrunsel et al., 1997), but the desire by the public for these types of programs would seem to indicate a lack of comprehension about their limitations. Also, consistent with water having a value other than its dollar value, the desire for command and control programs can be interpreted as support for rights based viewpoints: people who pollute and effect others in the community should have to make restitution (Montada & Kals, 2000).

The finding that some respondents were more concerned about forgoing economic gain for the sake of a cleaner environment than they were about process considerations is contrary to the Australian water allocation studies (Syme et al., 1999). In the Australian studies, it was found that fair decision-making processes were of paramount importance and that economic arguments were of a lesser importance to process considerations (Syme et al., 1999). In this study, more than half the respondents (individualists, N = 320) thought economic arguments more important than process consideration. Furthermore, their moderate support for the long-term health of the environment if it reduces short-term profits (Q22i = 65.1%) indicated a desired to for polluter pay policies that have minimal immediate economic impact. These findings are consistent with the individualist view that if artificial constraints (regulation and enforcement) are removed, there will be few limits to abundance for all and that this will more than compensate for any hazards created in the process (Rayner, 1988a). Conversely, egalitarian support for

these items can be interpreted as being consistent with advocating prescriptions that do not vary by rank and station (Dake, 1991). The implications of this finding for watershed managers is that they need to be particularly aware of program impacts and need to find innovative ways of funding their initiatives.

The egalitarian and individualist clusters differ significantly on the procedural justice consideration of whether the public should be involved in decision-making. The individualist cluster does not agree as strongly (73%) as the egalitarian group (87.3%) that the public should be involved. This is particularly interesting since both clusters do not differ (statistically) on people's right to have their say (Q22a) and accepting the decision of a fair process (Q22n). This would seem to indicate that there is a difference in what the two clusters consider a fair process. If individualists wish to have their say but not be as involved in the decision making process, then their criteria for a fair process probably includes less up front public involvement. Again, this is consistent with the individualist worldview: they seek to generate and stabilize a form of social relations and institutions that defend their freedom to bid and bargain in self-regulated networks with few prescriptions (Thompson, 1992). This low group/low grid finding would suggest that individualists would support the current American legal system where they can voice their concerns after a problem is perceived.

The two groups also differed significantly on whether the government should be involved in decision-making processes with the individualist group indicating a greater desire for minimal governmental intervention. Therefore, watershed-planning initiatives should strive to be seen as non-governmental agencies and autonomous of political affiliation. Furthermore, planning bodies need to recognize the necessity of soliciting

help from all facets of the community, not just those willing to participate (i.e., most likely egalitarian groups). A trusted spokesperson that can voice individualist concerns and communicate the initiative's intentions back to all factions of the community will go a long way towards having programs gain public acceptance.

Having established the differences between the clusters based on the fairness heuristic responses, it is necessary to point out that more than two-thirds to three-quarters of the sample population agreed with these statements. Watershed managers need to recognize that there are more similarities than differences between these groups. In most cases the differences that do exist are more a matter of degree and are concerned with how to proceed with implementation rather than being irreconcilable differences. As will be shown, this trend towards the presence of group differences within the context of overall general agreement is a common element to most of the study variables.

Comparisons of this study's conclusions to those found by the Australian studies indicate some differences. Although both agreed that a large portion of people believe in the "rights of the environment" and its preservation for a range of uses for future generations (Syme et al., 1999), they differed on their value of process. That is, the Australian study put process above economic concerns while at least half of the respondents in this study felt the opposite. Furthermore, not all eight items common to both studies and as ranked by the Australian studies appeared in this study's rankings and those that did were ranked differently. These differences probably indicate there are significant cultural distinctions between the countries on how they view and manage the environment and in particular, water resource management.



A country's laws reflect its culture and a brief look at the differences between the United States and Australian judicial systems may help explain the differences noted above. In the United States there is an "absolutist approach" with a heavy emphasis on the supremacy of the law, particularly the Constitution, and an attempt to avoid substantive issues (Bosselmann, 1997). On the other hand, Australia adopts a "balance of interests" approach that attempts to weigh all the various interests (Bosselmann, 1997). Specifically, Ministerial discretion is awarded to environmental agencies on when and when not to institute certain procedures (i.e. environmental impact assessments) (Meyer, 1996). The public then has the right to appeal ministerial decisions. Consequently there is a lack of judicial review and an emphasis on collaborative solutions in Australia (Meyer, 1996). Conversely, in the United States the importance of the law creates an atmosphere of scientific dominance where scientific results are used to support varying positions surrounding an issue and leaving the courts to sort out solutions. This adversarial system of checks and balances pits individuals and institutions against one another and offers a possible explanation as to why this study found process consideration ranked lower than economic considerations by half the respondents.

There is an implicit belief that information causes pro-environmental behavior (Eden, 1993). This research supports previous studies (Beckwith & Rayl, 2002; Hwang et al., 2000; Steel et al., 1990; Tarrant et al., 1997) that have found the impact of policy-relevant knowledge on behavioral intent to have little bearing. Even though there was a statistical difference between the knowledge of action strategies between the two clusters, it was not a determinant in predicting the intention to support BMP implementation. The partial correlations between attitude, locus of control and personal responsibility with

intent to act changed little when knowledge was controlled for. This means that knowledge is mediated, almost completely, by these variables. Interestingly, respondents cited a lack of knowledge as one reason for not wishing to participate in the study. If people are not making decisions based on what they know (or aware of), then other variables must be influencing their attitudes. There two possible explanations for this finding which more than likely are interdependent. First, the measures used to indicate knowledge in this study could be characterized as awareness about both the issues and action strategies. Although awareness does constitute a form of knowledge, it is arguably at a surface level and therefore may not invoke cognitive interaction with other study variables by respondents. The second possible explanation for the weak relationship between knowledge and the other variables might be due to Steel et al.'s (1990) suggestion that Americans are highly influenced by ideological and environmental value orientations (Steel et al., 1990). That is, the values the American people assign to environmental issues and the management decisions they support may have more to do with political ideology than how they value the environment.

The issue of transmitting knowledge to the public about BMP implementation is an important one. It was shown earlier that there is a real need to educate the public about the limitations of command and control regulations and the possibility of other types of programs. Yet, there exist two distinct ideological groups within the watershed each with their own worldview of the environment. This suggests that not only is the content of the message provided to the different constituencies complicated and problematic, but so is the issue of how to get the groups to even examine the message in the first place.

The theory of planned behavior was found to provide quite an accurate prediction of the intention to implement BMPs. In accordance with the theory, attitudes towards watershed management, subjective norms (personal responsibility) and perceptions of behavior control were significant determinants of the intent to support the implementations of BMPs. The successful application of the theory of planned behavior to the intention to support the implementation of BMPs is consistent with other research in which the theory effectively predicted intentions. The correlation for the sample population was .56 and for the individualist and egalitarian groups .56 and .55 respectively. These results are on the low end of previous studies reported in Sutton's (1998) meta-analysis. There are a few reasons why this might have occurred.

The first reason for the low (but still significant) correlations could be due to the fact that attitudinal factors derived from the exploratory factor analysis were not as tightly defined as if they had been determined a priori. Second, the variable of personal responsibility was used as a proxy for social norms. Although used in this way in the past (Geller, 1995; Guagnano, 1995; Schwartz, 1970, 1977), personal responsibility is only one aspect of social norms and may be too closely associated with both locus of control and the attitudes used in this study. Further evidence of these possible limitations comes from the reduced partial correlations and collinearity between the attitudinal factors (MORAL IMPERATIVES and RESISTANCE TO CHANGE) and the locus of control (LOC) and personal responsibility variables. Having couched the results in this context, the finding that egalitarians had a higher internal LOC than individualists and that there was collinearity between the study variables is consistent with Eden's (1993) supposition that feeling responsible is often dependent upon a belief in efficacy. That is, individuals

feel they can have some impact through their pro-environmental behavior as well as being able to choose what they undertake. According to Eden:

“Where efficacy is not perceived, responsibility is weakened because, without impact, individual acts are futile. It becomes, for most, pointless to ascribe responsibility to the self to undertake behavior which has no effect.”

(Eden, 1993, p.1748)

This link with impact rather than moral obligation has a utilitarian ethos to it (Eden, 1993) since responsibility is not initiated because of morality, but because of perceiving the ability to limit environmental damage. This is important to this study because in the multiple regression analysis, personal responsibility was not a determining variable in predicting the individualist cluster’s intent to implement BMPs. Eden offers this possible explanation:

... the perceived impact is significant and this supports Schwartz’s (1970, 1977) emphasis on the individual’s awareness of the consequences of his or her actions as contributing to responsibility ascription. Contextuality is therefore influential in that it affects how efficacy is perceived. Efficacy is reinforced for activists by their group situation, underlying the necessity of setting individual pro-environmental behaviors within social circumstances.”

(Eden, 1993, p.1749)

Therefore, even though individualists saw it in their control to do something about the problem of degraded water quality, they were unlikely to act upon it (relative to the egalitarian cluster) because they did not feel as responsible. The relative lack of personal responsibility felt by the individualist cluster was probably a result of their cultural relations that reinforce their belief that the environment is benign and does not need their attention. The implication of this insight for the watershed manager is that they must create and help maintain social organizations that are supported by all facets of the community so as to instill a sense of personal responsibility across all groups.

The other difference between the variables that helped predict the intent to implement BMPs was that education level was a determinant for egalitarians but not for individualists. One possibility for this result mentioned previously is that advanced levels of education are often associated with more liberal worldviews (Arcury et al., 1986; Christianson & Arcury, 1992), a variable not measured in this study. Still, there is evidence that this could be true. Recall in the analysis of the clusters, the egalitarians that are assumed to exhibit more liberal tendencies were also more likely to support all the BMP options. These results lead to the conclusion that simply possessing knowledge (awareness) about the issues and the implementation of BMPs is not sufficient to get people to support these types of policy initiatives.

Again it was shown that there were group differences, but that generally the study population was in agreement in terms of their psychological orientations towards the BMP implementation. The correlations between the study variables of attitudes, LOC and personal responsibility were all positive and substantial and both the knowledge categories were not significant. So even though there were statistical differences between the individualist and egalitarian clusters, their mean values for each of the respective scales indicated they both had a positive moral imperative attitudes, a negative resistance to change attitudes, positive LOC and personal responsibility.

There were some significant differences between individualists and egalitarians in terms of the types of BMP programs they preferred after their initial agreement on fines for polluters. Specifically, individualists sought voluntary and public information and education programs as their second and third choices and were less supportive of all the programs than the egalitarian cluster. This finding is consistent with their low grid

orientation, their general desire for fewer prescriptions and being more resistant to change. The resistance to change attitude involved issues such as minimal governmental intervention (i.e. more freedom) and the property rights. Therefore, it would seem individualists exhibit integrative or “trade-off” reasoning (Peterson, 1994) as is associated with a value pluralism approach (Sniderman et al., 1991; Sniderman & Tetlock, 1986b; Tetlock, 1986) to decision-making. Recall, this is where all their core values are highly and equally prized in the decision-making frame of reference.

Egalitarians preferred increased enforcement and stricter regulations in terms of their policy preferences and generally indicated greater support for all the policy categories. This conflicts with their low grid orientation but is consistent with their desire to create an equitable playing field within the community. One might expect these policy choices as they are seen as being generally valid and guarantee more equality for members of the community (Montada & Kals, 2000). The egalitarian’s frame for decision-making is more focused on the environment and therefore more monastic. As was seen previously, they were also more open to procedural justice initiatives. These observations suggest that an egalitarian’s frame of reference for decision-making involves both self-ascription and having an implicit assessment of efficacy (Eden, 1993) compared to their individualist counterparts.

Neither cluster indicated a preference for the zoning of open space or subsidies with these options consistently being ranked last. The strong economic values that came forth in the analysis are probably responsible for the negative evaluation of subsidies, while lack of support for increased zoning restrictions is more than likely a result of the strong support for property rights. Once more we see that despite the group differences,

there was relatively strong support for five of the seven proposed BMPs by all the respondents.

In general, invoking the concept of framing refers to the perceptual lenses, worldviews or underlying assumptions that guide communal interpretation and definition of particular values. Use of the concept of framing reflects the growing acknowledgement that how societies view the environment is not simply given by nature, but reflects collective moral choices about the legitimacy of the myriad of intersections between natural and human systems (Bardwell, 1991; Miller, 2000). This research has demonstrated that the worldviews of the two clusters of respondents, individualists and egalitarians, influenced their assessments of environmental change including the terms of participation, the range of policy options considered and the nature of the political intervention. These often divergent worldviews indicate there is an “interpretive flexibility” (Collins & Pinch, 1982) surrounding watershed management. It has already been shown that at the macro scale a country’s laws can serve to establish context and that previous efforts within the planning of Sycamore Creek watershed might have helped establish local context but neither of these by themselves or in cooperation can explain the subtle nuances surrounding the differences between the two cluster’s worldviews. One needs to better understand the social histories and dynamics of the area in order to achieve a deeper understanding of these groups. Obviously if there is general agreement about the desired outcomes, but not on how to achieve it, then a more in-depth look at how the groups frame the issues is needed so planning initiatives can move forward. It may be simply that individuals do draw on political ideology (Steel et al., 1990) to frame watershed issues but this may also not be the case. The obvious implication of this

conclusion is that deliberation must occur in order to create policies that reflect local context and make them acceptable to the community.

Implications for the Management of Sycamore Creek Watershed

With the growing tendency for the public to become more involved in decisions regarding the management of natural resources, there are practical implications to a greater understanding of the relationships among public values, attitudes and knowledge. First, attitudinal information can help managers understand the diverse sides of watershed management issues. Increasingly, the management of viable natural ecosystems can represent a multiplicity of public values (Bengston, 1994). Given that they must manage natural resources in the public interest, managers must recognize the extent to which these values and value orientations drive public attitudes towards specific issues. In this study, it was shown there were two groups of people with different value orientations or worldviews within the watershed and that the public is not simply monolithic in their views of how to manage watershed even if there is mutually agreed upon goal.

Second, a significant amount of research in social psychology and natural resource management has supported the notion that attitudes predispose or predict behavior. Such behavior can take an active form, as in participating in decision-making processes, or a more passive form such as support for specific watershed management practices. This is important because many decisions regarding resource management are being brought forward to the public through ballot initiatives. Regardless of the outcome of these initiatives, it is apparent that watershed managers must understand the nature of public attitudes and the resulting behavior. Using the identified cluster's worldviews as a lens to anticipate public reaction to proposed policies is one way for watershed managers

to understand public attitudes and behavior. For example, any proposed policy calling for immediate implementation that had an associated cost for the landowner attached to it, and administered by a government agency, would probably be opposed by the individualist cluster. Conversely, any proposed policy that did not have equality of outcomes for all individuals would probably meet opposition from the egalitarian cluster. Both of these reactions can be anticipated regardless of whether the groups agreed upon and desired the same end result.

If justice considerations moderate the relationship between attitude and behavior as it is theorized, then managers must also pay close attention to the processes in which policy is deliberated. Fairness judgments are an estimation of whether the right mix of “fairness ingredients” have been incorporated into the process (Syme et al., 1999). Key to the success of a project is the effective communication that the process in which decisions were reached was both open and transparent.

Understanding the nature of attitudes is complicated by the lack of a relationship between knowledge and behavior. The fact that knowledge is mediated by other psychological constructs complicates matters for two reasons. First, worldviews and attitudes were shown not to be dependent upon awareness of the issues or of the action strategies, thus confounding the issue of what to include in a persuasive communication to people in the watershed. Second, if the direct path between knowledge and attitudes is muddy, then either contextual factors or other value domains (i.e. political ideology) or both must be having an influence. It is the managers job to uncover the degree to which each of these might be involved in individual decision-making and make process adjustments to account for them so implementation goals can be set.

Recommendations for Future Research

This study produced two important findings: (1) that attitudes appeared to be moderated by fairness judgments and (2) that the theory of planned behavior was an effective tool for predicting behavioral intent. There were, however, some ways the results could be improved upon. First, the attitudinal factors need to be better defined. This researcher is confident the two factors that were derived indeed capture the essence of unique attitudes, but acknowledges there was collinearity between the other psychological variables that with some effort may be minimized. Focus groups and/or interviews may help in this regard while at the same time helping to better understand the local context.

Second, knowledge was measured through the indexing of several yes or no questions. Although this is an acceptable method of eliciting information, it is possible that a more complex instrument might yield different results. Furthermore, this study tried to break down knowledge into two components: knowledge of issues and knowledge of action strategies. This conceptual distinction in theory only yielded a minor difference in terms of responses. For these reasons, there needs to be further research into the structure of knowledge and its relationship with other psychological variables in environmental decision-making.

Third, past studies have indicated that the American public may formulate their attitudes based upon political ideology (Steel et al., 1990; Steel, 1996). Given the apparent lack of a relationship between knowledge and behavior and the weak relationship between knowledge and the other mediating variables of attitudes, locus of control, and responsibility, it seems prudent for future studies to incorporate political items aimed at measuring respondent ideology.

And lastly, although considerable effort went into capturing the situational factors that were known to influence decision-making, this study was still limited in the specifics that were introduced. Variables such as location, accessibility and payment vehicles are all important factors not considered in this study. Future studies might wish to incorporate these variables.

In all, the results of this study serve as a starting point for better understanding of how people think about managing their watershed. The study has been especially useful in isolating several issues needing attention when managing a watershed.

APPENDICES

Appendix A:

Survey And Response Rate Data

MICHIGAN STATE UNIVERSITY

June 26, 2001

TO: Scott G. WITTER
308 Natural Resources Building
MSU

RE: IRB # 00-567 CATEGORY: 2-G EXPEDITED

TITLE: PREDICTING SUPPORT FOR BEST MANAGEMENT PRACTICES IN THE RED CEDAR
WATERSHED BASED UPON INDIVIDUAL VALUES

ANNUAL APPROVAL DATE: October 10, 2000

REVISION REQUESTED: June 8, 2001

REVISION APPROVAL DATE: June 25, 2001

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete and I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS APPROVED THIS PROJECT'S REVISION.

This letter approves the addition of the mail survey.

RENEWALS: UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Projects continuing beyond one year must be renewed with the green renewal form. A maximum of four such expedited renewal are possible. Investigators wishing to continue a project beyond that time need to submit it again for a complete review.

REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB# and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.

PROBLEMS/CHANGES: Should either of the following arise during the course of the work, notify UCRIHS promptly: 1) problems (unexpected side effects, complaints, etc.) involving human subjects or 2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of further assistance, please contact us at 517 355-2180 or via email: UCRIHS@pilot.msu.edu.



OFFICE OF
**RESEARCH
AND
GRADUATE
STUDIES**

University Committee on
Research Involving
Human Subjects

Michigan State University
246 Administration Building
East Lansing, Michigan
48824-1046

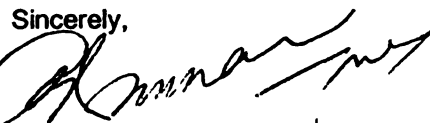
517/355-2180

FAX: 517/353-2976

Web: www.msu.edu/user/ucrths

E-Mail: ucrths@msu.edu

Sincerely,


Ashir Kumar, M.D.
Interim Chair, UCRIHS

AK: bd

cc: Stephen Pennington
1900 Pepper Tree Lane
Lansing, MI 48912

**UCRIHS APPROVAL FOR
THIS project EXPIRES:**

OCT 10 2001

SUBMIT RENEWAL APPLICATION
ONE MONTH PRIOR TO
ABOVE DATE TO CONTINUE

Aug 28 '2002

MICHIGAN STATE UNIVERSITY

July ??, 2001

Dear Mr/Mrs Stakeholder:

You are invited to participate in a study of the Red Cedar Watershed. The Red Cedar Watershed Coordinating Committee is a partnership of State, county and local governmental agencies together with the Department of Resource Development at Michigan State University. Our mission is to work together to better manage the biophysical and socio-economic resources of the Red Cedar Watershed in a sustainable, fair, and cost-effective manner. The primary goal of the proposed project is the creation of a watershed management plan that will be adopted by all community stakeholders, townships and county governments within the watershed. In order to foster widespread adoption and maintenance of the best management practices we ask for your participation by completing and returning the enclosed survey in the return addressed envelope provided.

Any information that is obtained in connection with this study will remain confidential. Only the investigators will have access to the raw data and any reports will convey information in the aggregate. Your privacy will be protected to the maximum extent allowable by the law.

Your decision whether or not to participate in this research component will not prejudice your future relations with the Red Cedar Watershed Coordination Committee or Michigan State University.



COLLEGE OF AGRICULTURE AND NATURAL RESOURCES

Resource
Development

Michigan State University
323 Natural Resources
East Lansing, Michigan
48824-1222
517/355-3421
FAX: 517/353-8994
<http://www.rd.msu.edu>

If you have any questions now or during the process, please feel free to contact us at one of the numbers listed below. If you have any questions regarding your rights as a research participant, please contact the University Committee on Research Involving Human Subjects (UCRIHS) chair David E. Wright at 355-2180.

Your signature indicates that you have read the information provided above and are willing to participate.

Thank you very much for your time and consideration!

Participant

Dr. Scott G. Witter
319 Natural Resources Bldg
Michigan State University
Phone (517) 355-3421
Fax (517) 353-8994
witter@msu.edu

Dr. Mike Kaplowitz
311a Natural Resources Bldg
Michigan State University
Phone (517) 355-0101
Fax (517) 353-8994
kalowitz@msu.edu

Stephen Pennington
302 Natural Resources Bldg
Michigan State University
Phone (517) 355-3415
Fax (517) 353-8994
pennin32@msu.edu

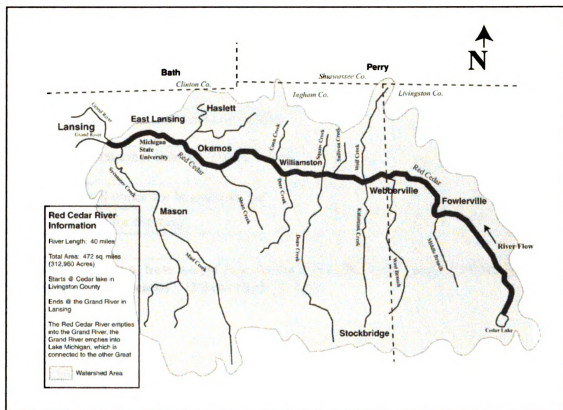
UCRIHS APPROVAL FOR
THIS project EXPIRES:

OCT 10 2001

SUBMIT RENEWAL APPLICATION
ONE MONTH PRIOR TO
ABOVE DATE TO CONTINUE

MICHIGAN STATE UNIVERSITY

The Red Cedar River and its Streams (Fall 2001)



This is an opportunity for you to provide information for local water resource planning. Your input will help planners make informed water quality decisions.

Thank you for your participation. This booklet contains several sections of brief questions that should take about 20 minutes to complete.

Please return your completed questionnaire in the enclosed envelope to:
**Red Cedar Project - K, Department of Resource Development, 323
 Natural Resources Building, Michigan State University, East Lansing,
 MI 48824-1222**

Section 1: Uses And Thoughts About The Red Cedar River

1) How often do you do the following activities in the Red Cedar Area? (Mark ☒ one response for each item)

		Never	Once a year	2 to 3 times a year	More than 4 times a year
a	Go fishing	☐	☐	☐	☐
b	Use river water for lawns or gardens	☐	☐	☐	☐
c	Go swimming	☐	☐	☐	☐
d	Irrigate crops	☐	☐	☐	☐
e	Drain excess water into the river	☐	☐	☐	☐
f	Use river as drinking supply for animals/pets	☐	☐	☐	☐
g	Use area for nature walks or wildlife viewing	☐	☐	☐	☐
h	Go recreational boating (canoe, kayak, etc.)	☐	☐	☐	☐
i	Use well water for household use	☐	☐	☐	☐
j	Use area for hunting	☐	☐	☐	☐
k	Other ()	☐	☐	☐	☐

2) In your opinion, how would you characterize the water quality of the Red Cedar River and its streams? (Please mark ☒ one)

- ☐ Poor
- ☐ Fair
- ☐ Good
- ☐ Excellent
- ☐ Don't know

3) Please read each statement below and indicate your level of agreement with each statement. (Please mark ☒ one for each statement)

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a	It is my personal responsibility to protect our rivers and streams for other people even if they seem unconcerned.	☐	☐	☐	☐	☐
b	It is not my responsibility to ensure the well being of other species on earth.	☐	☐	☐	☐	☐
c	I am partly responsible for the degraded state of our local rivers and streams.	☐	☐	☐	☐	☐
d	It is my responsibility to inform authorities about activities that violate our water protection laws.	☐	☐	☐	☐	☐

- 4) In your opinion, how important is it to you that the Red Cedar River and its streams support.... (Mark ☒ one response for each activity)

		Not Important	Somewhat Important	Extremely Important	Don't Know
a	Fishing	☐	☐	☐	☐
b	Watering lawn/garden	☐	☐	☐	☐
c	Swimming	☐	☐	☐	☐
d	A drain for excess water	☐	☐	☐	☐
e	Water supply for livestock/pets	☐	☐	☐	☐
f	Nature appreciation	☐	☐	☐	☐
g	Recreational Boating	☐	☐	☐	☐
h	Hunting	☐	☐	☐	☐
i	Other (_____)	☐	☐	☐	☐

- 5) Complete the following sentence with each of the statements below and indicate your level of agreement with each. (Mark ☒ one response for each complete statement)

My individual actions would improve water quality in local rivers and streams if I were to

....

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a	... attend a community meeting that involves concern over our local streams and rivers.	☐	☐	☐	☐	☐
b	... buy resource conservation devices, such as low-flow faucet for my sinks and shower heads.	☐	☐	☐	☐	☐
c	... report someone who violates a law or laws that protect our rivers and streams (e.g. illegal fishing, polluting) to the proper authorities.	☐	☐	☐	☐	☐
d	... convince someone to sign a petition regarding an issue surrounding our rivers and streams.	☐	☐	☐	☐	☐
e	... convince someone to buy household cleaning and/or laundry products that don't harm the environment.	☐	☐	☐	☐	☐
f	... convince someone to conserve water by not running the water while brushing their teeth or shaving and/or installing a water saving devices.	☐	☐	☐	☐	☐

Section 2: Water Quality Concerns

Experts have identified four concerns for the Red Cedar River and its streams. Pollution control programs are addressing some of these concerns. Other concerns require additional management practices.

2.1 Human and Animal Waste: Testing has found high levels of human and animal waste matter in the Red Cedar River and its streams. These levels make it unsafe to swim in the river 40% of the time. The problem of human and animal waste pollution is being addressed by 1) **stormwater plans** that separate sewer pipes from stormwater pipes, and 2) farm operations adopting **generally accepted agricultural management practices**.

6) **Have you heard about your community's combined stormwater overflow plan?**

No ☐

Yes ☐

7) **Have you heard about farmers in your community adopting generally accepted management practices?**

No ☐

Yes ☐

2.2 Non-Point Source Pollution (NPS): Non-Point Source pollution is the result of such things as oil, gas, salts, fertilizers, pesticides, and other materials from homeowners, industry and agriculture being washed into surface waterbodies by rain or snowmelt. These pollutants are spread over wide areas and cannot be traced to a single source. While not visible, NPS pollution degrades water quality, impairs fish habitat and raises health concerns.

8) **Have you heard about non-point source pollutants in the Red Cedar?**

No ☐

Yes ☐

Water Quality Concerns (continued)

2.3 Increased Flow and Flooding: There has been increasing urban and rural growth around the Red Cedar River and its streams. The additional hard surfaces (e.g. pavement) associated with urban and rural growth increases the amount and speed of water entering directly into the river and streams. Water moving directly into waterways destroys plant and animal habitat and causes flooding.

9) **Are you aware of flooding problems in the Red Cedar or its streams?**

No ☐

Yes ☐

2.4 Erosion and Sedimentation: Erosion is the process of water washing soil into waterways. Sedimentation is the settling of soil particles on the bottom of a water body (e.g. rivers, lakes). The removal of vegetative cover (e.g. forest, grass, brush, etc.) increases soil erosion and sedimentation. The murky water seen during and after storm events is a result of erosion. Too much sedimentation can result in the loss of plant and animal habitat. One cause of erosion and sedimentation is construction in developing areas.

10) **Are you aware of erosion prone areas of the Red Cedar River or its streams?**

No ☐

Yes ☐

Section 3: Best Management Practices.

Experts recommend combinations of practices to improve water quality in the Red Cedar River system. The best management practices (BMPs) below control **non-point source pollution, flooding and erosion**. Other programs address animal and human waste concerns. All BMP projects include **education programs** for landowners, builders and others in the community. Some BMPs use **upland areas**; others use **lowland areas** near the river and streams; while still others use land along **stream banks**.

UPLAND BMPs

Dry Basins: Dry basins are designed to hold runoff water. A dry basin allows water to seep into the ground and slows runoff into drainage systems. They empty after a storm event and are dry most of the time. Dry basins have a limited ability to remove soil particles and pollutants.

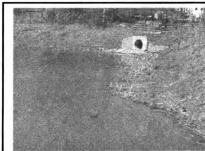


Plans with **MANY** dry basins would have dry basins throughout available areas.

Plans with **SOME** dry basins would have dry basins in only the most critical areas.

11) Have you seen a Dry Basin in your community? ☐ No ☐ Yes ☐ Don't know

Wet Ponds: Wet ponds have a permanent pool of water and keep most stormwater runoff on site until it evaporates or seeps into the surrounding soils. Soil particles and some pollutants may settle in wet ponds



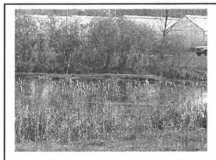
Plans using **MANY** wet ponds would have wet ponds throughout available areas.

Plans using **SOME** wet ponds would have wet ponds in only the most critical areas.

12) Have you seen a Wet Pond in your community? ☐ No ☐ Yes ☐ Don't know

LOWLAND BMPs

Wetlands: Wetlands refer to areas with wet soil and the plants and animals that live there. Examples of wetlands include wooded wetlands and marshes. Natural and man-made wetlands may filter pollutants, slow water flow and reduce flooding. Wetlands may be found near to rivers and streams.

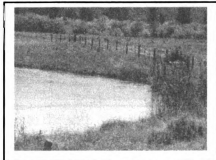


Plans with **MANY** wetlands would have wetlands in almost all available areas.

Plans with **SOME** wetlands would have wetlands in only the most critical areas.

13) Have you seen a Wetland in your community? ☐ No ☐ Yes ☐ Don't know

Filter Strips: Filter strips are areas of land 5' to 30' wide near rivers and streams. Grasses, shrubs or trees can be used for filter strips. They allow stormwater to seep into the soil, reduce erosion and slow water entering rivers. Filter strips trap some pollutants.



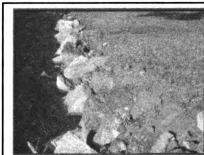
Plans with **MANY** filter strips would have strips in almost all available areas.

Plans with **SOME** filter strips would have strips in only the most critical areas.

14) Have you seen a Filter Strip in your community? ☐ No ☐ Yes ☐ Don't know

STREAM BANK BMPs

Rip Rap: Rip Rap are large stones placed along stream banks and stormwater inlets to protect them from flowing water. Rip Rap slows down water flow and reduces stream bank erosion and sedimentation. Rip Rap does not usually remove pollutants other than erosion.



Plans with **MANY** rip raps would have rip rap along almost all available stream banks.

Plans with **SOME** rip raps would have rip rap along only the most critical stream banks.

15) Have you seen Rip Rap in your community? ☐ No ☐ Yes ☐ Don't know

Streambank Naturalization:

Streambank natural-ization uses native grasses, plants, trees, rocks, and tree stumps to rebuild the banks of streams or rivers.

Streambank natural-ization slows runoff, traps pollutants and sediments and allows water to seep into the soil.



Plans with **MANY** naturalizations would have it along almost all available stream banks.

Plans with **SOME** naturalizations would have it along only the most critical stream banks.

16) Have you seen Streambank Naturalization in your community?

☐ No ☐ Yes ☐ Don't Know

Section 4: BMP Combinations

Additional BMPs Needed

The **current management practices** in the Red Cedar River area **do not adequately protect** water quality. Additional BMPs such as dry basins, wet ponds, filter strips, wetlands, rip rap and stream bank naturalization will improve water quality. There are areas available for **additional BMPs** in the Red Cedar River area.

Combining BMPs

Individual BMPs are **combined** together to improve water quality. Water resource experts recommend different combinations of BMPs. For the Red Cedar River and its streams, several **different combinations** can improve the Red Cedar's water quality so that it will become swimmable and fishable.

Achieve Same Water Quality

BMP combinations are known as **plans**. Each plan suggested by a panel of experts will help achieve the **same water quality** for the Red Cedar. However, each of the plans differ in the particular BMPs they use. That is, each plan uses **different levels** of the six possible BMPs discussed above in Section 3.

Same Cost to Community

Each of the proposed plans is estimated to **cost the same** amount to your community. That is, each plan will result in the **same water quality** improvements, **cost the same** to your community and use **different BMPs**.

Section 5: Implementation Information

The use of BMPs are often part of larger programs to improve water quality and protect natural resources. We would like your input on some complimentary elements and approaches that may be used for improving water quality in the Red Cedar River and its streams.

20) In your opinion, how supportive would you be of the following?

(Mark ☒ one response for each item)

		Would Not Support	Might Support	Would Support	Strongly Support	Do Not Know
a	Zoning requirements for some open space to be preserved on undeveloped land.	☐	☐	☐	☐	☐
b	Subsidies to landowners for environmentally friendly practices.	☐	☐	☐	☐	☐
c	Stricter regulations on activities that impact waterways during development.	☐	☐	☐	☐	☐
d	Fines for polluting.	☐	☐	☐	☐	☐
e	Increased enforcement of environmental regulations.	☐	☐	☐	☐	☐
f	Public information and education programs.	☐	☐	☐	☐	☐
g	Voluntary programs to help landowners adopt environmentally friendly practices.	☐	☐	☐	☐	☐

21) Mark your three preferred information sources about water quality issues in the Red Cedar River and its streams?

- ☐ Michigan Department of Agriculture
- ☐ Natural Resource Conservation Service
- ☐ Michigan State University (other than Extension)
- ☐ Michigan State University Extension
- ☐ Michigan Department of Environmental Quality
- ☐ Soil Conservation District
- ☐ Drain Commissioners
- ☐ Farm Bureau
- ☐ County Health Department
- ☐ Michigan Environmental Council
- ☐ Local Newspapers
- ☐ Broadcast Media TV/Radio
- ☐ Other (_____)

Section 6: Attitudes and Beliefs

Designing and implementing water quality plans can be improved when managers understand the opinions of the people living in the area. To help give policy makers and planners for the Red Cedar River a better understanding of how you feel, please answer the following questions.

22) For the statements below, please share with us your opinion on how much you agree with each. (Mark ☒ one response for each item)

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a	All members of the community have a right to their say on issues involving water management.	☐	☐	☐	☐	☐
b	Everyone may have to make some personal sacrifices if we are going to have effective water resource programs.	☐	☐	☐	☐	☐
c	You cannot really solve water pollution problems by analyzing the costs and benefits in dollars.	☐	☐	☐	☐	☐
d	Everyone owns rivers and streams and therefore they should be managed for the overall public benefit.	☐	☐	☐	☐	☐
e	Those who pollute the most should pay the greatest share of clean up and protection costs.	☐	☐	☐	☐	☐
f	The environment has the same right to water as people have.	☐	☐	☐	☐	☐
g	Public involvement should not be part of the decision-making process for managing water resources.	☐	☐	☐	☐	☐
h	Water pollution programs should be made to maximize the overall economic income of the community.	☐	☐	☐	☐	☐
i	The long-term environmental health of local waterways should be achieved even if it reduces short-term business profits.	☐	☐	☐	☐	☐
j	Water has value other than its dollar value.	☐	☐	☐	☐	☐

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
k	The government does not need to be involved in cleaning up and protecting water resources.	☐	☐	☐	☐	☐
l	If we are to clean up and protect our rivers, it should be done so as to minimize conflict in communities.	☐	☐	☐	☐	☐
m	Those upstream have a moral responsibility to look after the interests of those downstream.	☐	☐	☐	☐	☐
n	If the decision-making process is fair, people should accept its decisions for addressing water pollution.	☐	☐	☐	☐	☐
o	If new water pollution programs hurt some people's livelihoods, they should receive compensation.	☐	☐	☐	☐	☐
p	Groundwater (water under land) is the property of the landowner above.	☐	☐	☐	☐	☐
q	When it comes to clean waterways, the environment should be a secondary consideration to people.	☐	☐	☐	☐	☐
r	Saving waterways for the future is more important than making money now.	☐	☐	☐	☐	☐
s	While some parts of the natural environment are valuable and should be preserved, some are not so valuable and should not be preserved.	☐	☐	☐	☐	☐
t	There is not time to wait for exact environmental knowledge, we need to act now.	☐	☐	☐	☐	☐

Section 7: Demographics

23) How long have you lived in the Ingham/Livingston County area?

_____ years

24) How long have you lived in your current home?

_____ years

25) Do you currently own or rent your home?

- ☐ Own
- ☐ Rent

26) Which category includes your age?

- ☐ 18 to 24 years
- ☐ 25 to 34 years
- ☐ 35 to 44 years
- ☐ 45 to 54 years
- ☐ 55 to 64 years
- ☐ 65 +

27) Please indicate your *highest* level of education.

- ☐ Less than High School Graduate
- ☐ High School or GED
- ☐ Some College
- ☐ College Graduate
- ☐ Post Graduate Degree

28) Which category includes your household's gross income?

- ☐ Less than \$10,000
- ☐ \$10,000 – \$14,999
- ☐ \$15,000 – \$19,999
- ☐ \$20,000 – \$29,999
- ☐ \$30,000 – \$39,999
- ☐ \$40,000 – \$49,999
- ☐ \$50,000 – \$59,999
- ☐ \$60,000 – \$69,999
- ☐ \$70,000 +

29) How many adults (18 years of age and over) currently live in your household? _____

30) How many children under 18 currently live in your household?

Feel free to use the back cover if you have any further comments.

Thank you for your time!

Please place the survey in the envelope provided and return it to:
**Red Cedar Project, Department of Resource Development, 323 Natural
Resources Building, Michigan State University, East Lansing, MI
48824-1222**

Comments:

Original number of surveys		1650		
		wave 1	wave 2	wave 3 (Choice Exp. Only)
undeliverable		21	15	10
Return to Sender	(RTS)	15	8	10
Blanks		9	10	10
returns		423	185	Total 608
response rate (rr)		26.0%	11.3%	
wave rr		26%	16%	
	response rate	0.3767		
rr if RTS = undeliverable		0.3943		

Appendix B:

Response Frequencies For Survey Questions

Mean, Standard Deviation and Variance for all questions						
	Valid N	Missing	Mean	Std. Deviation	Variance	
Q1A	608	0	1.52	1.623	2.635	
Q1B	608	0	1.38	1.574	2.476	
Q1C	608	0	1.44	1.643	2.698	
Q1D	608	0	1.42	1.748	3.054	
Q1E	608	0	1.50	1.831	3.351	
Q1F	608	0	1.47	1.792	3.212	
Q1G	608	0	2.80	1.590	2.529	
Q1H	608	0	1.69	1.653	2.733	
Q1I	608	0	1.55	1.749	3.058	
Q1J	608	0	1.49	1.693	2.866	
Q1K	608	0				
Q2	608	0	3.64	2.872	8.248	
Q3A	608	0	4.08	1.192	1.421	
Q3B_RC	608	0	4.41	1.226	1.504	
Q3C	608	0	2.99	1.619	2.623	
Q3D	608	0	4.19	1.099	1.207	
Q4A	608	0	2.66	1.683	2.834	
Q4B	608	0	2.53	2.374	5.636	
Q4C	608	0	2.52	2.050	4.201	
Q4D	608	0	3.25	2.331	5.433	
Q4E	608	0	3.05	2.432	5.914	
Q4F	608	0	3.00	1.303	1.699	
Q4G	608	0	2.59	1.692	2.864	
Q4H	608	0	2.63	2.339	5.471	
Q4I	608	0				
Q5A	608	0	3.33	1.188	1.412	
Q5B	608	0	3.63	1.227	1.505	
Q5C	608	0	4.26	.934	.873	
Q5D	608	0	3.50	1.132	1.282	
Q5E	608	0	3.94	1.032	1.065	
Q5F	608	0	3.78	1.158	1.341	
Q6	608	0	.36	1.387	1.925	
Q7	608	0	-.51	1.607	2.583	
Q8	608	0	-.02	1.523	2.319	
Q9	608	0	.62	1.189	1.413	
Q10	608	0	-.14	1.427	2.036	
Q11	608	0	3.50	4.045	16.362	
Q12	608	0	2.33	3.351	11.229	
Q13	608	0	1.45	2.172	4.719	
Q14	608	0	3.40	3.984	15.871	
Q15	608	0	1.98	3.478	12.097	
Q16	608	0	3.14	3.765	14.176	
C17	608	0	2.08	2.061	4.247	

	Valid N	Missing	Mean	Std. Deviation	Variance
C18	608	0	2.26	2.198	4.831
C19	608	0	2.19	2.201	4.844
Q20A	608	0	3.67	1.725	2.977
Q20B	608	0	3.26	1.865	3.478
Q20C	608	0	3.66	1.573	2.475
Q20D	608	0	3.78	1.257	1.581
Q20E	608	0	3.62	1.435	2.059
Q20F	608	0	3.52	1.420	2.016
Q20G	608	0	3.54	1.457	2.123
Q21_MDA	608	0	.28	.448	.200
Q21_NRCS	608	0	.27	.444	.197
Q21_MSU	608	0	.20	.397	.158
Q21_MSUE	608	0	.27	.446	.199
Q21_MDEQ	608	0	.34	.474	.224
Q21_SCD	608	0	.12	.329	.108
Q21_DC	608	0	.14	.349	.122
Q21_FB	608	0	.04	.206	.043
Q21_HD	608	0	.19	.391	.153
Q21_MEC	608	0	.10	.294	.086
Q21_LNP	608	0	.44	.496	.246
Q21_TV	608	0	.38	.486	.236
Q21_O	608	0			
Q22A	608	0	4.16	.923	.853
Q22B	608	0	4.06	.877	.769
Q22C	608	0	3.63	1.288	1.659
Q22D	608	0	4.05	1.024	1.049
Q22E	608	0	4.45	.856	.732
Q22F	608	0	4.11	1.159	1.343
Q22G_RC	608	0	4.06	1.113	1.240
Q22H	608	0	3.27	1.446	2.092
Q22I	608	0	3.98	1.119	1.253
Q22J	608	0	4.44	.960	.923
Q22K_RC	608	0	4.14	1.117	1.248
Q22L	608	0	3.64	1.156	1.337
Q22M	608	0	4.21	1.164	1.356
Q22N	608	0	4.04	1.160	1.346
Q22O	608	0	3.41	1.383	1.914
Q22P	608	0	2.92	1.566	2.452
Q22Q	608	0	2.64	1.691	2.861
Q22R	608	0	4.12	1.178	1.388
Q22S_RC	608	0	3.59	1.372	1.883
Q22T	608	0	3.73	1.385	1.917
Q23	608	0	37.9959	23.22396	539.35212
Q24	608	0	20.8298	22.08461	487.73003

	Valid N	Missing	Mean	Std. Deviation	Variance
Q25	608	0	1.28	1.462	2.138
Q26	608	0	4.25	1.585	2.512
Q27	608	0	3.61	1.437	2.064
Q28	608	0	7.77	4.561	20.804
Q29	608	0	2.00	1.583	2.506
Q30	608	0	.78	1.839	3.383

Frequencies

Q1a How often do you go fishing in the Red Cedar River?				
	Frequency	Percent	Valid Percent	Cumulative %
Never	513	84.4	84.4	84.4
Once a Year	26	4.3	4.3	88.7
2 to 3 times a yr	29	4.8	4.8	93.4
> 4 times a year	17	2.8	2.8	96.2
no response	23	3.8	3.8	100.0
Total	608	100.0	100.0	

Q1b How often do you use water from the Red Cedar River for your lawn or garden?				
	Frequency	Percent	Valid Percent	Cumulative %
Never	566	93.1	93.1	93.1
Once a Year	1	.2	.2	93.3
2 to 3 times a yr	9	1.5	1.5	94.7
> 4 times a year	9	1.5	1.5	96.2
no response	23	3.8	3.8	100.0
Total	608	100.0	100.0	

Q1c How often do you go swimming in Red Cedar River?				
	Frequency	Percent	Valid Percent	Cumulative %
Never	547	90.0	90.0	90.0
Once a Year	14	2.3	2.3	92.3
2 to 3 times a yr	11	1.8	1.8	94.1
> 4 times a year	11	1.8	1.8	95.9
no response	25	4.1	4.1	100.0
Total	608	100.0	100.0	

Q1d How often do you irrigate your crops with water from the Red Cedar River?				
	Frequency	Percent	Valid Percent	Cumulative %
Never	573	94.2	94.2	94.2
2 to 3 times a yr	1	.2	.2	94.4
> 4 times a year	4	.7	.7	95.1
no response	30	4.9	4.9	100.0
Total	608	100.0	100.0	

Q1e	How often do you drain excess water into the Red Cedar River?			
	Frequency	Percent	Valid Percent	Cumulative %
Never	559	91.9	91.9	91.9
2 to 3 times a yr	3	.5	.5	92.4
> 4 times a year	14	2.3	2.3	94.7
no response	32	5.3	5.3	100.0
Total	608	100.0	100.0	

Q1f	How often do you use the Red Cedar River as drinking supply for animals/pets?			
	Frequency	Percent	Valid Percent	Cumulative %
Never	560	92.1	92.1	92.1
Once a Yr	2	.3	.3	92.4
2 to 3 times a year	7	1.2	1.2	93.6
> 4 times a year	8	1.3	1.3	94.9
no response	31	5.1	5.1	100.0
Total	608	100.0	100.0	

Q1g	How often do use the Red Cedar River area for nature walks or wildlife viewing?			
	Frequency	Percent	Valid Percent	Cumulative %
Never	165	27.1	27.1	27.1
Once a Year	90	14.8	14.8	41.9
2 to 3 times a yr	139	22.9	22.9	64.8
> 4 times a year	197	32.4	32.4	97.2
no response	17	2.8	2.8	100.0
Total	608	100.0	100.0	

Q1h	How often do you go recreational boating in the Red Cedar River?			
	Frequency	Percent	Valid Percent	Cumulative %
Never	442	72.7	72.7	72.7
Once a Year	74	12.2	12.2	84.9
2 to 3 times a yr	43	7.1	7.1	91.9
> 4 times a year	26	4.3	4.3	96.2
no response	23	3.8	3.8	100.0
Total	608	100.0	100.0	

Q1i	How often do you use well water for household use?			
	Frequency	Percent	Valid Percent	Cumulative %
Never	539	88.7	88.7	88.7
2 to 3 times a yr	2	.3	.3	89.0
> 4 times a year	41	6.7	6.7	95.7
no response	26	4.3	4.3	100.0
Total	608	100.0	100.0	

Q1j	How often do you use the Red Cedar River area for hunting?			
	Frequency	Percent	Valid Percent	Cumulative %
Never	540	88.8	88.8	88.8
Once a Year	10	1.6	1.6	90.5
2 to 3 times a yr	15	2.5	2.5	92.9
> 4 times a year	17	2.8	2.8	95.7
no response	26	4.3	4.3	100.0
Total	608	100.0	100.0	

Q1k	How often do you use the Red Cedar River or surrounding area for other activities?			
	Frequency	Percent	Valid Percent	Cumulative %
Blank	585	96.2	96.2	96.2
Bicycling	1	.2	.2	96.4
Biking (3x)	1	.2	.2	96.5
Bird Watching (4x)	1	.2	.2	96.7
Bird, wildlife watching	1	.2	.2	96.9
Cross-country skiing (4x)	1	.2	.2	97.0
Dogs go swimming (>4x)	1	.2	.2	97.2
Drive over (4x)	1	.2	.2	97.4
Exercise (4x)	1	.2	.2	97.5
Flood relief (4x)	1	.2	.2	97.7
Golfing (4x)	1	.2	.2	97.9
Mountain biking (4x)	1	.2	.2	98.0
Other (3x)	1	.2	.2	98.2
Other (4x)	1	.2	.2	98.4
Photo opts (4x)	1	.2	.2	98.5
River trail for biking (4x)	1	.2	.2	98.7
Running, walking (4x)	1	.2	.2	98.8
Scenic/Bird watching (4x)	1	.2	.2	99.0
Sight seeing, hiking (1x)	1	.2	.2	99.2
Visit city overlooks (3x)	1	.2	.2	99.3
Wading (4x)	1	.2	.2	99.5
Walk dog, sit by MSU (4x)	1	.2	.2	99.7
Walks at MSU (3x)	1	.2	.2	99.8
XX skiing, snowshoeing (4x)	1	.2	.2	100.0
Total	608	100.0	100.0	

Q2	How would you characterize the water quality of the Red Cedar River and its streams			
	Frequency	Percent	Valid Percent	Cumulative %
Poor	145	23.8	23.8	23.8
Fair	198	32.6	32.6	56.4
Good	90	14.8	14.8	71.2
Excellent	5	.8	.8	72.0
Don't Know	150	24.7	24.7	96.7
No Response	20	3.3	3.3	100.0
Total	608	100.0	100.0	

Q3a	It is my personal responsibility to protect our rivers and streams for other people even if they seem unconcerned.			
	Frequency	Percent	Valid Percent	Cumulative %t
Strongly Disagree	8	1.3	1.3	1.3
Disagree	26	4.3	4.3	5.6
Neutral	104	17.1	17.1	22.7
Agree	316	52.0	52.0	74.7
Strongly Agree	136	22.4	22.4	97.0
No Response	18	3.0	3.0	100.0
Total	608	100.0	100.0	

Q3b-recoded	It is not my responsibility to ensure the well being of other species on earth.			
	Frequency	Percent	Valid Percent	Cumulative %
Strongly Disagree	4	.7	.7	.7
Disagree	29	4.8	4.8	5.4
Neutral	52	8.6	8.6	14.0
Agree	242	39.8	39.8	53.8
Strongly Agree	259	42.6	42.6	96.4
No Response	22	3.6	3.6	100.0
Total	608	100.0	100.0	

Q3c	I am partly responsible for the degraded state of our local rivers and stream.			
	Frequency	Percent	Valid Percent	Cumulative %
Strongly Disagree	97	16.0	16.0	16.0
Disagree	144	23.7	23.7	39.6
Neutral	169	27.8	27.8	67.4
Agree	156	25.7	25.7	93.1
Strongly Agree	19	3.1	3.1	96.2
No Response	23	3.8	3.8	100.0
Total	608	100.0	100.0	

Q3d	It is my responsibility to inform authorities about activities that violate our water protection laws.			
	Frequency	Percent	Valid Percent	Cumulative %
Strongly Disagree	9	1.5	1.5	1.5
Disagree	16	2.6	2.6	4.1
Neutral	67	11.0	11.0	15.1
Agree	333	54.8	54.8	69.9
Strongly Agree	168	27.6	27.6	97.5
No Response	15	2.5	2.5	100.0
Total	608	100.0	100.0	

Q4a	How important to you is it that the Red Cedar River and its stream support fishing?			
	Frequency	Percent	Valid Percent	Cumulative %
Not Important	72	11.8	11.8	11.8
Somewhat Important	287	47.2	47.2	59.0
Extremely Important	207	34.0	34.0	93.1
Don't Know	27	4.4	4.4	97.5
No Response	15	2.5	2.5	100.0
Total	608	100.0	100.0	

Q4b	How important to you is it that the Red Cedar River and its stream support watering lawns and gardens?			
	Frequency	Percent	Valid Percent	Cumulative %
Not Important	252	41.4	41.4	41.4
Somewhat Important	222	36.5	36.5	78.0
Extremely Important	49	8.1	8.1	86.0
Don't Know	67	11.0	11.0	97.0
No Response	18	3.0	3.0	100.0
Total	608	100.0	100.0	

Q4c	How important to you is it that the Red Cedar River and its stream support swimming?			
	Frequency	Percent	Valid Percent	Cumulative %
Not Important	182	29.9	29.9	29.9
Somewhat Important	252	41.4	41.4	71.4
Extremely Important	113	18.6	18.6	90.0
Don't Know	44	7.2	7.2	97.2
No Response	17	2.8	2.8	100.0
Total	608	100.0	100.0	

Q4d	How important to you is it that the Red Cedar River and its stream support draining excess water?			
	Frequency	Percent	Valid Percent	Cumulative %
Not Important	88	14.5	14.5	14.5
Somewhat Important	208	34.2	34.2	48.7
Extremely Important	208	34.2	34.2	82.9
Don't Know	88	14.5	14.5	97.4
No Response	16	2.6	2.6	100.0
Total	608	100.0	100.0	

Q4e	How important to you is it that the Red Cedar River and its stream be a water supply for livestock or pets?			
	Frequency	Percent	Valid Percent	Cumulative %
Not Important	124	20.4	20.4	20.4
Somewhat Important	269	44.2	44.2	64.6
Extremely Important	109	17.9	17.9	82.6
Don't Know	90	14.8	14.8	97.4
No Response	16	2.6	2.6	100.0
Total	608	100.0	100.0	

Q4f	How important to you is it that the Red Cedar River and its stream support nature appreciation?			
	Frequency	Percent	Valid Percent	Cumulative %
Not Important	11	1.8	1.8	1.8
Somewhat Important	138	22.7	22.7	24.5
Extremely Important	429	70.6	70.6	95.1
Don't Know	21	3.5	3.5	98.5
No Response	9	1.5	1.5	100.0
Total	608	100.0	100.0	

Q4g	How important to you is it that the Red Cedar River and its stream support recreational boating?			
	Frequency	Percent	Valid Percent	Cumulative %
Not Important	88	14.5	14.5	14.5
Somewhat Important	294	48.4	48.4	62.8
Extremely Important	184	30.3	30.3	93.1
Don't Know	29	4.8	4.8	97.9
No Response	13	2.1	2.1	100.0
Total	608	100.0	100.0	

Q4h	How important to you is it that the Red Cedar River and its stream support hunting?			
	Frequency	Percent	Valid Percent	Cumulative %
Not Important	219	36.0	36.0	36.0
Somewhat Important	225	37.0	37.0	73.0
Extremely Important	79	13.0	13.0	86.0
Don't Know	69	11.3	11.3	97.4
No Response	16	2.6	2.6	100.0
Total	608	100.0	100.0	

Q4i	How important to you is it that the Red Cedar River and its stream support other activities?			
	Frequency	Percent	Valid Percent	Cumulative %
	583	95.9	95.9	95.9
Clean environment for wildlife (3)	1	.2	.2	96.1
Disease control (3)	1	.2	.2	96.2
Habitat for wildlife (2)	1	.2	.2	98.0
Hiking (3)	1	.2	.2	98.2
Hiking, rec. use (2)	1	.2	.2	98.4
Make attractive pts of in	1	.2	.2	98.5
Mountain biking (3)	1	.2	.2	98.7
Nature Trail (3)	1	.2	.2	98.8
Support wildlife (3)	1	.2	.2	99.7
Sustainable env. (3)	1	.2	.2	99.8
The view (3)	1	.2	.2	100.0
Total	608	100.0	100.0	
2 = Somewhat Important, 3 = Extremely Important				

Q 5a	My individual actions would improve water quality in local rivers and streams if I were to attend a community meeting that involves concern over our local streams and rivers.			
	Frequency	Percent	Valid Percent	Cumulative %
Strongly Disagree	23	3.8	3.8	3.8
Disagree	90	14.8	14.8	18.6
Neutral	238	39.1	39.1	57.7
Agree	223	36.7	36.7	94.4
Strongly Agree	22	3.6	3.6	98.0
No Response	12	2.0	2.0	100.0
Total	608	100.0	100.0	

Q5b	My individual actions would improve water quality in local rivers and streams if I were to buy resource conservation devices such as....			
	Frequency	Percent	Valid Percent	Cumulative %
Strongly Disagree	19	3.1	3.1	3.1
Disagree	74	12.2	12.2	15.3
Neutral	145	23.8	23.8	39.1
Agree	297	48.8	48.8	88.0
Strongly Agree	60	9.9	9.9	97.9
No Response	13	2.1	2.1	100.0
Total	608	100.0	100.0	

Q5c	My individual actions would improve water quality in local rivers and streams if I were report someone who violates a law or laws that protect our rivers and streams to the proper authorities.			
	Frequency	Percent	Valid Percent	Cumulative %
Strongly Disagree	5	.8	.8	.8
Disagree	8	1.3	1.3	2.1
Neutral	53	8.7	8.7	10.9
Agree	342	56.3	56.3	67.1
Strongly Agree	190	31.3	31.3	98.4
No Response	10	1.6	1.6	100.0
Total	608	100.0	100.0	

Q5d	My individual actions would improve water quality in local rivers and streams if I were convince someone to sign a petition regarding an issue surrounding our rivers and streams.			
	Frequency	Percent	Valid Percent	Cumulative %
Strongly Disagree	14	2.3	2.3	2.3
Disagree	48	7.9	7.9	10.2
Neutral	266	43.8	43.8	53.9
Agree	225	37.0	37.0	91.0
Strongly Agree	43	7.1	7.1	98.0
No Response	12	2.0	2.0	100.0
Total	608	100.0	100.0	

Q5e	My individual actions would improve water quality in local rivers and streams if I were convince someone to buy household cleaning and/or laundry products that don't harm the environment.			
	Frequency	Percent	Valid Percent	Cumulative %
Strongly Disagree	6	1.0	1.0	1.0
Disagree	27	4.4	4.4	5.4
Neutral	116	19.1	19.1	24.5
Agree	352	57.9	57.9	82.4
Strongly Agree	96	15.8	15.8	98.2
No Response	11	1.8	1.8	100.0
Total	608	100.0	100.0	

Q5f	My individual actions would improve water quality in local rivers and streams if I were convince someone to conserve water by not running the water while brushing their teeth or shaving and/or installing a water saving device.			
	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	17	2.8	2.8	2.8
Disagree	47	7.7	7.7	10.5
Neutral	135	22.2	22.2	32.7
Agree	306	50.3	50.3	83.1
Strongly Agree	92	15.1	15.1	98.2
No Response	11	1.8	1.8	100.0
Total	608	100.0	100.0	

Q6	Have you heard about your community's combined stormwater overflow plan?			
	Frequency	Percent	Valid Percent	Cumulative %
no	226	37.2	37.2	37.2
yes	374	61.5	61.5	98.7
No Response	8	1.3	1.3	100.0
Total	608	100.0	100.0	

Q7	Have you heard about farmers in your community adopting generally accepted management practices?			
	Frequency	Percent	Valid Percent	Cumulative %
no	516	84.9	84.9	84.9
yes	78	12.8	12.8	97.7
No Response	14	2.3	2.3	100.0
Total	608	100.0	100.0	

Q8	Have you heard about non-point source pollutants in the Red Cedar?			
	Frequency	Percent	Valid Percent	Cumulative %
no	350	57.6	57.6	57.6
yes	248	40.8	40.8	98.4
No Response	10	1.6	1.6	100.0
Total	608	100.0	100.0	

Q9	Are you aware of flooding problems in the Red Cedar or its streams?			
	Frequency	Percent	Valid Percent	Cumulative %
no	141	23.2	23.2	23.2
yes	461	75.8	75.8	99.0
No Response	6	1.0	1.0	100.0
Total	608	100.0	100.0	

Q10	Are you aware of erosion prone areas of the Red Cedar River or its streams?			
	Frequency	Percent	Valid Percent	Cumulative %
no	379	62.3	62.3	62.3
yes	221	36.3	36.3	98.7
No Response	8	1.3	1.3	100.0
Total	608	100.0	100.0	

Q11	Have you seen a Dry Basin in your community?			
	Frequency	Percent	Valid Percent	Cumulative %
no	169	27.8	27.8	27.8
yes	175	28.8	28.8	56.6
Don't Know	257	42.3	42.3	98.8
No Response	7	1.2	1.2	100.0
Total	608	100.0	100.0	

Q12	Have you seen a Wet Pond in your community?			
	Frequency	Percent	Valid Percent	Cumulative %
no	121	19.9	19.9	19.9
yes	338	55.6	55.6	75.5
Don't Know	142	23.4	23.4	98.8
No Response	7	1.2	1.2	100.0
Total	608	100.0	100.0	

Q13	Have you seen a Wetland in your community?			
	Frequency	Percent	Valid Percent	Cumulative %
no	58	9.5	9.5	9.5
yes	495	81.4	81.4	91.0
Don't Know	51	8.4	8.4	99.3
No Response	4	.7	.7	100.0
Total	608	100.0	100.0	

Q14	Have you seen a Filter Strip in your community?			
	Frequency	Percent	Valid Percent	Cumulative %
no	161	26.5	26.5	26.5
yes	193	31.7	31.7	58.2
Don't Know	251	41.3	41.3	99.5
No Response	3	.5	.5	100.0
Total	608	100.0	100.0	

Q15	Have you seen Rip Rap in your community?			
	Frequency	Percent	Valid Percent	Cumulative %
no	207	34.0	34.0	34.0
yes	257	42.3	42.3	76.3
Don't Know	141	23.2	23.2	99.5
No Response	3	.5	.5	100.0
Total	608	100.0	100.0	

Q16	Have you seen Streambank Naturalization in your community?			
	Frequency	Percent	Valid Percent	Cumulative %
no	125	20.6	20.6	20.6
yes	262	43.1	43.1	63.7
Don't Know	217	35.7	35.7	99.3
No Response	4	.7	.7	100.0
Total	608	100.0	100.0	

C17	Which of these two plans would you prefer in your community?			
	Frequency	Percent	Valid Percent	Cumulative %
Plan A	279	45.9	45.9	45.9
Plan B	282	46.4	46.4	92.3
No Response	47	7.7	7.7	100.0
Total	608	100.0	100.0	

C18	Which of these two plans would you prefer in your community?			
	Frequency	Percent	Valid Percent	Cumulative %
Plan A	231	38.0	38.0	38.0
Plan B	321	52.8	52.8	90.8
No Response	56	9.2	9.2	100.0
Total	608	100.0	100.0	

C19	Which of these two plans would you prefer in your community?			
	Frequency	Percent	Valid Percent	Cumulative %
Plan A	268	44.1	44.1	44.1
Plan B	285	46.9	46.9	91.0
No Response	55	9.0	9.0	100.0
Total	608	100.0	100.0	

Q20a	How supportive would you be of zoning requirements for some open space to be preserved on undeveloped land?			
	Frequency	Percent	Valid Percent	Cumulative %
Would Not Support	21	3.5	3.5	3.5
Might Support	98	16.1	16.1	19.6
Would Support	193	31.7	31.7	51.3
Strongly Support	239	39.3	39.3	90.6
Do Not Know	36	5.9	5.9	96.5
No Response	21	3.5	3.5	100.0
Total	608	100.0	100.0	

Q20b	How supportive would you be of subsidies to landowners for environmentally friendly practices?			
	Frequency	Percent	Valid Percent	Cumulative %
Would Not Support	53	8.7	8.7	8.7
Might Support	163	26.8	26.8	35.5
Would Support	216	35.5	35.5	71.1
Strongly Support	118	19.4	19.4	90.5
Do Not Know	39	6.4	6.4	96.9
No Response	19	3.1	3.1	100.0
Total	608	100.0	100.0	

Q20c	How supportive would you be of stricter regulations on activities that impact waterways during development?			
	Frequency	Percent	Valid Percent	Cumulative %
Would Not Support	16	2.6	2.6	2.6
Might Support	65	10.7	10.7	13.3
Would Support	238	39.1	39.1	52.5
Strongly Support	241	39.6	39.6	92.1
Do Not Know	30	4.9	4.9	97.0
No Response	18	3.0	3.0	100.0
Total	608	100.0	100.0	

Q20d	How supportive would you be of fines for polluting?			
	Frequency	Percent	Valid Percent	Cumulative %
Would Not Support	10	1.6	1.6	1.6
Might Support	42	6.9	6.9	8.6
Would Support	151	24.8	24.8	33.4
Strongly Support	376	61.8	61.8	95.2
Do Not Know	16	2.6	2.6	97.9
No Response	13	2.1	2.1	100.0
Total	608	100.0	100.0	

Q20e	How supportive would you be of increased enforcement of environmental regulations?			
	Frequency	Percent	Valid Percent	Cumulative %
Would Not Support	21	3.5	3.5	3.5
Might Support	60	9.9	9.9	13.3
Would Support	206	33.9	33.9	47.2
Strongly Support	286	47.0	47.0	94.2
Do Not Know	19	3.1	3.1	97.4
No Response	16	2.6	2.6	100.0
Total	608	100.0	100.0	

Q20f	How supportive would you be public information and education programs?			
	Frequency	Percent	Valid Percent	Cumulative %
Would Not Support	12	2.0	2.0	2.0
Might Support	75	12.3	12.3	14.3
Would Support	260	42.8	42.8	57.1
Strongly Support	227	37.3	37.3	94.4
Do Not Know	17	2.8	2.8	97.2
No Response	17	2.8	2.8	100.0
Total	608	100.0	100.0	

Q20g	How supportive would you be voluntary programs to help landowners adopt environmentally friendly practices?			
	Frequency	Percent	Valid Percent	Cumulative %
Would Not Support	9	1.5	1.5	1.5
Might Support	72	11.8	11.8	13.3
Would Support	278	45.7	45.7	59.0
Strongly Support	210	34.5	34.5	93.6
Do Not Know	23	3.8	3.8	97.4
No Response	16	2.6	2.6	100.0
Total	608	100.0	100.0	

Q21	Three preferred information sources:	
Organization	Frequency	Ranking
MDA	168	4
NRCS	164	6
MSU	119	7
MSUE	166	5
MDEQ	206	3
Soil CD	75	10
Drain Commission	86	9
Farm Bureau	27	12
Co. Health Dept.	114	8
MEC	58	11
Newspapers	226	2
TV/Radio	232	1
Others, MUCC, MI Pork Producers, Sierra Club, EPA, PIRGIM, Individual Mailings		

Questions 22 a-t; Please see summary Table 10 or Appendix E.

Question 23 & 24 see mean, standard deviation and variances above.

Q25	Do you currently own or rent your home?			
	Frequency	Percent	Valid Percent	Cumulative %
Own	587	96.5	96.5	96.5
No Response	21	3.5	3.5	100.0
Total	608	100.0	100.0	

Q26	Which category includes your age?			
	Frequency	Percent	Valid Percent	Cumulative %
18 - 24 yrs	6	1.0	1.0	1.0
25 - 34 yrs	79	13.0	13.0	14.0
35 - 44 yrs	119	19.6	19.6	33.6
45 - 54 yrs	155	25.5	25.5	59.0
55 - 64 yrs	107	17.6	17.6	76.6
65 + yrs	123	20.2	20.2	96.9
No Response	19	3.1	3.1	100.0
Total	608	100.0	100.0	

Q27	Please indicate your highest level of education.			
	Frequency	Percent	Valid Percent	Cumulative %
< High School Graduate	20	3.3	3.3	3.3
Some School or GED	101	16.6	16.6	19.9
Some College	179	29.4	29.4	49.3
College Graduate	181	29.8	29.8	79.1
Post graduate Degree	108	17.8	17.8	96.9
No Response	19	3.1	3.1	100.0
Total	608	100.0	100.0	

Q28	Which category includes your household income?			
	Frequency	Percent	Valid Percent	Cumulative %
< \$10,000 /yr	13	2.1	2.1	2.1
10,000 - 14,999 / yr	13	2.1	2.1	4.3
15,000 - 19,999 /yr	18	3.0	3.0	7.2
20,000 - 29,999 /yr	64	10.5	10.5	17.8
30,000 - 39,999 /yr	92	15.1	15.1	32.9
40,000 - 49,999 /yr	88	14.5	14.5	47.4
50,000 - 59,999 /yr	77	12.7	12.7	60.0
60,000 - 69,999 /yr	59	9.7	9.7	69.7
70,000 + /yr	112	18.4	18.4	88.2
No Response	72	11.8	11.8	100.0
Total	608	100.0	100.0	

Q29	How many adults (18 years of age and over) currently live in your household?			
	Frequency	Percent	Valid Percent	Cumulative %
0	27	4.4	4.4	4.4
1	172	28.3	28.3	32.7
2	339	55.8	55.8	88.5
3	36	5.9	5.9	94.4
4	7	1.2	1.2	95.6
5	2	.3	.3	95.9
6	2	.3	.3	96.2
No Response	23	3.8	3.8	100.0
Total	608	100.0	100.0	

Q30	How many children under 18 currently live in your household?			
	Frequency	Percent	Valid Percent	Cumulative %
0	431	70.9	70.9	70.9
1	72	11.8	11.8	82.7
2	58	9.5	9.5	92.3
3	20	3.3	3.3	95.6
4	3	.5	.5	96.1
5	1	.2	.2	96.2
No Response	23	3.8	3.8	100.0
Total	608	100.0	100.0	

Appendix C:

Exploratory Factor Analysis Output

Descriptive Statistics

	Mean	Std. Deviation	Analysis N
Q22A	4.07	.655	538
Q22B	4.00	.666	538
Q22C	3.51	.965	538
Q22D	3.97	.812	538
Q22E	4.39	.675	538
Q22F	3.99	.859	538
Q22G_RC	3.98	.863	538
Q22H	3.05	.948	538
Q22I	3.83	.773	538
Q22J	4.35	.728	538
Q22K	1.93	.890	538
Q22L	3.51	.853	538
Q22M	4.04	.777	538
Q22N	3.85	.666	538
Q22O	3.19	.838	538
Q22P	2.66	.992	538
Q22Q	2.31	.906	538
Q22R	3.99	.793	538
Q22S	2.59	.945	538
Q22T	3.52	.952	538

Communalities

	Initial	Extraction
Q22A	1.000	.517
Q22B	1.000	.465
Q22C	1.000	.488
Q22D	1.000	.431
Q22E	1.000	.385
Q22F	1.000	.541
Q22G_RC	1.000	.637
Q22H	1.000	.625
Q22I	1.000	.528
Q22J	1.000	.412
Q22K	1.000	.404
Q22L	1.000	.548
Q22M	1.000	.401
Q22N	1.000	.531
Q22O	1.000	.534
Q22P	1.000	.387
Q22Q	1.000	.442
Q22R	1.000	.516
Q22S	1.000	.693
Q22T	1.000	.367

Extraction Method: Principal Component Analysis with Varimax Rotation

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.190	20.952	20.952	4.190	20.952	20.952	2.745	13.727	13.727
2	1.975	9.874	30.825	1.975	9.874	30.825	2.222	11.112	24.839
3	1.440	7.198	38.023	1.440	7.198	38.023	1.756	8.781	33.621
4	1.217	6.083	44.106	1.217	6.083	44.106	1.697	8.483	42.104
5	1.030	5.150	49.256	1.030	5.150	49.256	1.430	7.152	49.256
6	.957	4.786	54.042						
7	.907	4.535	58.577						
8	.875	4.375	62.952						
9	.863	4.317	67.268						
10	.800	4.000	71.268						
11	.718	3.592	74.860						
12	.698	3.491	78.352						
13	.659	3.296	81.647						
14	.630	3.150	84.797						
15	.580	2.899	87.696						
16	.567	2.833	90.530						
17	.536	2.678	93.207						
18	.495	2.477	95.684						
19	.479	2.394	98.078						
20	.384	1.922	100.000						

Extraction Method: Principal Component Analysis

Components

	Components				
	1	2	3	4	5
Q22N	.638	.191	-5.152E-02	.286	-5.921E-02
Q22M	.611	4.078E-02	-9.367E-02	.130	1.779E-02
Q22J	.591	.155	-6.776E-02	-.170	6.879E-02
Q22E	.516	.105	-.173	-.252	.117
Q22R	.501	.440	-.162	-.204	-5.982E-02
Q22I	.499	.480	-3.133E-02	-.149	-.161
Q22C	4.296E-02	.668	9.287E-02	-3.346E-02	.172
Q22T	.163	.535	-.211	-8.148E-02	-5.460E-02
Q22B	.428	.523	-2.892E-02	5.419E-02	-5.974E-02
Q22F	.104	.513	-.451	-.124	.220
Q22D	.416	.450	-4.083E-02	2.538E-02	.231
Q22S	-1.116E-02	-.128	.815	-2.260E-02	.110
Q22Q	-.235	4.855E-03	.609	.120	3.014E-02
Q22H	.105	-1.375E-02	4.034E-02	.781	-5.241E-02
Q22L	.270	-.228	.341	.500	.239
Q22P	-.202	-.147	-.100	.449	.336
Q22K	-.295	-2.962E-02	.339	.448	-2.983E-02
Q22O	-.177	9.259E-02	.112	.115	.684
Q22A	.263	.104	2.184E-02	-4.672E-02	.659
Q22G_RC	.292	-.378	-.366	-.351	.390

Extraction Method: Principal Component Analysis

Rotation Method: Varimax with Kaiser Normalization

A Rotation converged in 9 iterations.

Three Factor Analyses

Normal analysis requested

Items have been assigned to factors as follows:

501 = 4 3 2 1

502 = 6 9 5 8 7

503 = 10 12 13 11

Average correlation within clusters:

.2683333 .252 .205

Standard score coefficient alphas:

.595 .627 .508

Item and factor correlation matrix

	4	3	2	1	6	9	5	8	7	10	12	13	11	501	502	503
4	22	34	24	17	13	17	33	11	34	16	12	-6	-13	47	43	5
3	34	32	25	26	10	19	25	15	20	0	7	-6	-9	56	35	-4
2	24	25	30	35	16	14	27	27	24	-4	0	-12	-17	55	43	-18
1	17	26	35	24	12	18	28	28	23	-6	-6	-15	-26	49	43	-29
6	13	10	16	12	22	19	31	20	26	-2	3	-12	-2	25	47	-7
9	17	19	14	18	19	19	27	27	18	-4	-14	-11	-22	33	44	-28
5	33	25	27	28	31	27	34	26	28	5	-2	-16	-15	54	58	-15
8	11	15	27	28	20	27	26	27	30	-12	-17	-9	-22	39	52	-33
7	34	20	24	23	26	18	28	30	26	-1	3	-9	-17	49	51	-13
10	16	0	-4	-6	-2	-4	5	-12	-1	33	34	15	23	3	-6	58
12	12	7	0	-6	3	-14	-2	-17	3	34	27	14	20	6	-11	52
13	-6	-6	-12	-15	-12	-11	-16	-9	-9	15	14	9	17	-19	-23	30
11	-13	-9	-17	-26	-2	-22	-15	-22	-17	23	20	17	18	-31	-31	43
501	47	56	55	49	25	33	54	39	49	3	6	-19	-31	100	79	-22
502	43	35	43	43	47	44	58	52	51	-6	-11	-23	-31	79	100	-38
503	5	-4	-18	-29	-7	-28	-15	-33	-13	58	52	30	43	-22	-38	100

***** Sampling error analysis *****

Sample size = 608

Analysis for cluster number 1

Internal consistency analysis

Within cluster correlation matrix for this cluster

	4	3	2	1
4	22	34	24	17
3	34	32	25	26
2	24	25	30	35
1	17	26	35	24
501	47	56	55	49

Significance test for deviation from a flat

within cluster correlation matrix. That is, a test for the compound hypothesis (a) the items are unidimensional (all measure the same construct) and (b) the items are uniform in quality.

The value of chisquare is 25.677

The degrees of freedom are 5

The tail probability is .000

Significance test for deviation from a unidimensional

within cluster correlation matrix that allows for variation in quality. That is, a test of the hypothesis the items all measure the same construct which allows for a gradient in item quality.

The value of chisquare is 22.822

The degrees of freedom are 5

The tail probability is .000

Analysis of parallelism

Item by factor correlation matrix for this cluster

	4	3	2	1
501	***			
502	43	35	43	43
503	5	-4	-18	-29

	Qualities	--
501	47	56
	55	49

Tests for parallelism

Test for flat tests for parallel AND uniform quality

Test with gradient allows for variation in quality

Cluster	Test for flat			Test with gradient		
	Chisq	DF	p	Chisq	DF	p
501		***				
502	2.317	3	0.509	7.390	3	0.060
503	28.235	3	0.000	26.938	3	0.000
TOTAL	37.164	6	0.000	41.758	6	0.000

Analysis for cluster number 2

Internal consistency analysis

Within cluster correlation matrix for this cluster

	6	9	5	8	7
6	22	19	31	20	26
9	19	19	27	27	18
5	31	27	34	26	28
8	20	27	26	27	30
7	26	18	28	30	26
502	47	44	58	52	51

Significance test for deviation from a flat

within cluster correlation matrix. That is, a test for the compound hypothesis (a) the items are unidimensional (all measure the same construct) and (b) the items are uniform in quality.

The value of chisquare is 20.536
The degrees of freedom are 9
The tail probability is .015

Significance test for deviation from a unidimensional
within cluster correlation matrix that allows for variation
in quality. That is, a test of the hypothesis the items all
measure the same construct which allows for a gradient
in item quality.

The value of chisquare is 12.122
The degrees of freedom are 9
The tail probability is .207

Analysis of parallelism
Item by factor correlation matrix for this cluster

	6	9	5	8	7
501	25	33	54	39	49
502	***				
503	-7	-28	-15	-33	-13

	Qualities --				
502	47	44	58	52	51

Tests for parallelism
Test for flat tests for parallel AND uniform quality
Test with gradient allows for variation in quality

Cluster	Test for flat			Test with gradient		
	Chisq	DF	p	Chisq	DF	p
501	27.784	4	0.000	15.093	4	0.005
502	***					
503	18.951	4	0.000	20.467	4	0.000
TOTAL	52.496	8	0.000	39.944	8	0.000

Analysis for cluster number 3

Internal consistency analysis
Within cluster correlation matrix for this cluster

	10	12	13	11
10	33	34	15	23
12	34	27	14	20
13	15	14	9	17
11	23	20	17	18
503	58	52	30	43

Significance test for deviation from a flat within cluster correlation matrix. That is, a test for the compound hypothesis (a) the items are unidimensional (all measure the same construct) and (b) the items are uniform in quality.

The value of chisquare is 26.224

The degrees of freedom are 5

The tail probability is .000

Significance test for deviation from a unidimensional within cluster correlation matrix that allows for variation in quality. That is, a test of the hypothesis the items all measure the same construct which allows for a gradient in item quality.

The value of chisquare is 5.084

The degrees of freedom are 5

The tail probability is .406

Analysis of parallelism

Item by factor correlation matrix for this cluster

```

      10  12  13  11
501   3   6 -19 -31
502  -6 -11 -23 -31
503   ***

```

```

Qualities --
503  58  52  30  43

```

Tests for parallelism

Test for flat tests for parallel AND uniform quality

Test with gradient allows for variation in quality

Cluster	Test for flat			Test with gradient		
	Chisq	DF	p	Chisq	DF	p
501	43.745	3	0.000	56.166	3	0.000
502	19.076	3	0.000	35.238	3	0.000
503	***					
TOTAL	32.338	6	0.000	47.051	6	0.000

Two factor Analysis

Normal analysis requested

Items have been assigned to factors as follows:

501 = 4 3 2 1 6 9 5 8 7

502 = 10 12 13 11

Average correlation within clusters:

.2297222 .205

Standard score coefficient alphas:

.729 .508

Item and factor correlation matrix

	4	3	2	1	6	9	5	8	7	10	12	13	11	501	502
4	23	34	24	17	13	17	33	11	34	16	12	-6	-13	48	5
3	34	20	25	26	10	19	25	15	20	0	7	-6	-9	45	-4
2	24	25	25	35	16	14	27	27	24	-4	0	-12	-17	50	-18
1	17	26	35	24	12	18	28	28	23	-6	-6	-15	-26	49	-29
6	13	10	16	12	14	19	31	20	26	-2	3	-12	-2	37	-7
9	17	19	14	18	19	17	27	27	18	-4	-14	-11	-22	41	-28
5	33	25	27	28	31	27	37	26	28	5	-2	-16	-15	61	-15
8	11	15	27	28	20	27	26	23	30	-12	-17	-9	-22	48	-33
7	34	20	24	23	26	18	28	30	29	-1	3	-9	-17	54	-13
10	16	0	-4	-6	-2	-4	5	-12	-1	33	34	15	23	-2	58
12	12	7	0	-6	3	-14	-2	-17	3	34	27	14	20	-3	52
13	-6	-6	-12	-15	-12	-11	-16	-9	-9	15	14	9	17	-22	30
11	-13	-9	-17	-26	-2	-22	-15	-22	-17	23	20	17	18	-33	43
501	48	45	50	49	37	41	61	48	54	-2	-3	-22	-33	100	-33
502	5	-4	-18	-29	-7	-28	-15	-33	-13	58	52	30	43	-33	100

***** Sampling error analysis *****

Sample size = 608

Analysis for cluster number 1

Internal consistency analysis

Within cluster correlation matrix for this cluster

	4	3	2	1	6	9	5	8	7
4	23	34	24	17	13	17	33	11	34
3	34	20	25	26	10	19	25	15	20
2	24	25	25	35	16	14	27	27	24
1	17	26	35	24	12	18	28	28	23
6	13	10	16	12	14	19	31	20	26
9	17	19	14	18	19	17	27	27	18
5	33	25	27	28	31	27	37	26	28
8	11	15	27	28	20	27	26	23	30
7	34	20	24	23	26	18	28	30	29
501	48	45	50	49	37	41	61	48	54

Significance test for deviation from a flat within cluster correlation matrix. That is, a test for the compound hypothesis (a) the items are unidimensional (all measure the same construct) and (b) the items are uniform in quality.

The value of chisquare is 171.075

The degrees of freedom are 35

The tail probability is .000

Significance test for deviation from a unidimensional within cluster correlation matrix that allows for variation in quality. That is, a test of the hypothesis the items all measure the same construct which allows for a gradient in item quality.

The value of chisquare is 113.144

The degrees of freedom are 35

The tail probability is .000

Analysis of parallelism

Item by factor correlation matrix for this cluster

	4	3	2	1	6	9	5	8	7
501	***								
502	5	-4	-18	-29	-7	-28	-15	-33	-13

	Qualities --								
501	48	45	50	49	37	41	61	48	54

Tests for parallelism

Test for flat tests for parallel AND uniform quality

Test with gradient allows for variation in quality

Cluster	Test for flat			Test with gradient		
	Chisq	DF	p	Chisq	DF	p
501		***				
502	50.407	8	0.000	50.359	8	0.000
TOTAL	50.407	8	0.000	50.359	8	0.000

Analysis for cluster number 2

Internal consistency analysis

Within cluster correlation matrix for this cluster

```

      10  12  13  11
10  33  34  15  23
12  34  27  14  20
13  15  14   9  17
11  23  20  17  18

```

```
502  58  52  30  43
```

Significance test for deviation from a flat within cluster correlation matrix. That is, a test for the compound hypothesis (a) the items are unidimensional (all measure the same construct) and (b) the items are uniform in quality.

The value of chisquare is 26.224

The degrees of freedom are 5

The tail probability is .000

Significance test for deviation from a unidimensional within cluster correlation matrix that allows for variation in quality. That is, a test of the hypothesis the items all measure the same construct which allows for a gradient in item quality.

The value of chisquare is 5.084

The degrees of freedom are 5

The tail probability is .406

Analysis of parallelism

Item by factor correlation matrix for this cluster

```

      10  12  13  11
501  -2  -3 -22 -33
502   ***

```

```

Qualities --
502  58  52  30  43

```

Tests for parallelism

Test for flat tests for parallel AND uniform quality

Test with gradient allows for variation in quality

Cluster	Test for flat			Test with gradient		
	Chisq	DF	p	Chisq	DF	p
501	38.462	3	0.000	58.311	3	0.000
502	***					
TOTAL	38.462	3	0.000	58.311	3	0.000

Appendix D:

Cluster Analysis Output

Initial Cluster Centers

	Cluster	
	1	2
FACTOR1	2.78	4.00
FACTOR3	5.00	.33

Iteration History

	Change in Cluster Centers	
Iteration	1	2
1	1.972	1.934
2	2.067E-02	2.437E-02
3	3.495E-03	4.106E-03
4	.000	.000

a Convergence achieved due to no or small distance change.

The maximum distance by which any center has changed is .000. The current iteration is 4. The minimum distance between initial centers is 4.824.

Final Cluster Centers

	Cluster	
	1	2
FACTOR1	3.82	4.02
FACTOR3	3.30	2.25

Distances between Final Cluster Centers

Cluster	1	2
1		1.075
2	1.075	

ANOVA

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
FACTOR1	6.290	1	.241	597	26.060	.000
FACTOR3	165.871	1	.169	597	979.479	.000

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Number of Cases in each Cluster

Cluster	1	320.000
	2	279.000
Valid		599.000
Missing		9.000

Group Statistics

	Cluster Members hip	N	Mean	Std. Deviation	Std. Error Mean
FACTOR1	1	320	3.8153	.52211	.02919
	2	279	4.0207	.45336	.02714
FACTOR3	1	320	3.3010	.40889	.02286
	2	279	2.2461	.41451	.02482

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
FACTOR1	Equal variances assumed	8.859	.003	-5.105	597	.000	-.2054	.04024	-.2845	-.12640
	Equal variances not assumed			-5.154	596.991	.000	-.2054	.03986	-.2837	-.12715
FACTOR3	Equal variances assumed	2.067	.151	31.297	597	.000	1.0549	.03371	.98873	1.12112
	Equal variances not assumed			31.267	583.678	.000	1.0549	.03374	.98866	1.12119

Appendix E:

Fairness Heuristic Analysis Output

Statistics

	N		Mean	Std. Deviation
	Valid	Missing		
Q22A	597	11	4.08	.655
Q22B	600	8	3.99	.670
Q22C	593	15	3.50	.976
Q22D	598	10	3.96	.805
Q22E	600	8	4.39	.680
Q22F	593	15	3.98	.869
Q22G_RC	596	12	3.96	.874
Q22H	586	22	3.05	.943
Q22I	592	16	3.84	.766
Q22J	596	12	4.35	.717
Q22K	597	11	1.94	.910
Q22L	595	13	3.53	.851
Q22M	588	20	4.05	.771
Q22N	586	22	3.85	.661
Q22O	585	23	3.19	.844
Q22P	584	24	2.67	.985
Q22Q	578	30	2.31	.892
Q22R	590	18	3.97	.825
Q22S	588	20	2.59	.957
Q22T	586	22	3.53	.952

Frequencies

		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	Total	Mean	Std. Dev.
Q22a	Frequency	1	14	59	388	135	597	4.08	0.655
	Valid Percent	0.2	2.3	9.9	65	22.6	100		
Q22b	Frequency	6	12	65	415	102	600	3.99	0.67
	Valid Percent	1	2	10.8	69.2	17	100		
Q22c	Frequency	17	81	160	259	76	593	3.5	0.976
	Valid Percent	2.9	13.7	27	43.7	12.8	100		
Q22d	Frequency	6	32	73	354	133	598	3.96	0.805
	Valid Percent	1	5.4	12.2	59.2	22.2	100		
Q22e	Frequency	0	8	43	255	294	600	4.39	0.68
	Valid Percent	0	1.3	7.2	42.5	49	100		
Q22f	Frequency	7	30	97	292	167	593	3.98	0.869
	Valid Percent	1.2	5.1	16.4	49.2	28.2	100		
Q22g-RC	Frequency	12	28	82	321	153	596	3.96	0.874
	Valid Percent	2	4.7	13.8	53.9	25.7	100		
Q22h	Frequency	30	130	229	172	25	586	3.05	0.943
	Valid Percent	5.1	22.2	39.1	29.4	4.3	100		
Q22i	Frequency	4	26	125	341	96	592	3.84	0.766
	Valid Percent	0.7	4.4	21.1	57.6	16.2	100		
Q22j	Frequency	8	5	22	296	265	596	4.35	0.717
	Valid Percent	1.3	0.8	3.7	49.7	44.5	100		
Q22k	Frequency	201	280	75	30	11	597	1.94	0.91
	Valid Percent	33.7	46.9	12.6	5	1.8	100		
Q22l	Frequency	8	67	174	296	50	595	3.53	0.851
	Valid Percent	1.3	11.3	29.2	49.7	8.4	100		
Q22m	Frequency	7	21	56	357	147	588	4.05	0.771
	Valid Percent	1.2	3.6	9.5	60.7	25	100		
Q22n	Frequency	3	24	87	414	58	586	3.85	0.661
	Valid Percent	0.5	4.1	14.8	70.6	9.9	100		
Q22o	Frequency	16	91	264	191	23	585	3.19	0.844
	Valid Percent	2.7	15.6	45.1	32.6	3.9	100		
Q22p	Frequency	59	211	196	97	21	584	2.67	0.985
	Valid Percent	10.1	36.1	33.6	16.6	3.6	100		
Q22q	Frequency	85	306	120	59	8	578	2.31	0.893
	Valid Percent	14.7	52.9	20.8	10.2	1.4	100		
Q22r	Frequency	13	15	86	338	138	590	3.97	0.825
	Valid Percent	2.2	2.5	14.6	57.3	23.4	100		
Q22s	Frequency	61	240	178	95	14	588	2.59	0.957
	Valid Percent	10.4	40.8	30.3	16.2	2.4	100		
Q22t	Frequency	14	71	169	253	79	586	3.53	0.952
	Valid Percent	2.4	12.1	28.8	43.2	13.5	100		

Agree and Strongly Agree Combined Responses for Fairness Heuristic

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Q22AREDU	Equal variances assumed	13.394	.000	-1.828	594	.068
	Equal variances not assumed			-1.860	587.395	.063
Q22BREDU	Equal variances assumed	44.159	.000	-3.372	596	.001
	Equal variances not assumed			-3.450	575.430	.001
Q22CREDU	Equal variances assumed	.061	.805	-1.318	591	.188
	Equal variances not assumed			-1.318	579.206	.188
Q22DREDU	Equal variances assumed	10.858	.001	-1.813	595	.070
	Equal variances not assumed			-1.829	594.931	.068
Q22EREDU	Equal variances assumed	25.398	.000	-2.535	597	.011
	Equal variances not assumed			-2.587	581.198	.010
Q22FREDU	Equal variances assumed	72.611	.000	-4.751	591	.000
	Equal variances not assumed			-4.847	576.795	.000
Q22GREDU	Equal variances assumed	83.254	.000	-4.638	594	.000
	Equal variances not assumed			-4.774	558.056	.000
Q22HREDU	Equal variances assumed	2.290	.131	21.486	584	.000
	Equal variances not assumed			21.360	551.218	.000
Q22IREDU	Equal variances assumed	55.509	.000	-4.560	590	.000
	Equal variances not assumed			-4.628	588.347	.000
Q22JREDU	Equal variances assumed	.247	.619	-.303	593	.762
	Equal variances not assumed			-.301	564.008	.764
Q22KREDU	Equal variances assumed	700.414	.000	10.519	595	.000
	Equal variances not assumed			11.252	344.719	.000
Q22LREDU	Equal variances assumed	68.581	.000	15.813	593	.000
	Equal variances not assumed			15.207	418.055	.000
Q22MREDU	Equal variances assumed	2.317	.128	-.903	583	.367
	Equal variances not assumed			-.904	576.633	.366
Q22NREDU	Equal variances assumed	3.057	.081	-.793	581	.428
	Equal variances not assumed			-.799	580.997	.424
Q22OREDU	Equal variances assumed	16.214	.000	2.369	580	.018
	Equal variances not assumed			2.384	578.922	.017
Q22PREDU	Equal variances assumed	.365	.546	3.887	579	.000
	Equal variances not assumed			3.904	577.871	.000
Q22QREDU	Equal variances assumed	55.698	.000	5.241	573	.000
	Equal variances not assumed			5.316	565.610	.000
Q22RREDU	Equal variances assumed	63.481	.000	-4.300	583	.000
	Equal variances not assumed			-4.374	566.935	.000
Q22SREDU	Equal variances assumed	7.370	.007	3.954	583	.000
	Equal variances not assumed			3.984	582.940	.000
Q22TREDU	Equal variances assumed	15.049	.000	-3.604	581	.000
	Equal variances not assumed			-3.636	580.465	.000

Correlations between Fairness Heuristic Items

Q22a	Q22b	Q22c	Q22d	Q22e	Q22f	Q22g	Q22h	Q22i	Q22j	Q22k	Q22l	Q22m	Q22n	Q22o	Q22p	Q22q	Q22r	Q22s	Q22t
Q22b	1																		
Q22c	.088**	1																	
Q22d	.247**	.305**	1																
Q22e	.155**	.275**	.117**	1															
Q22f	.175**	.262**	.202**	.298**	1														
Q22g	.162**	-.0012	-.094**	.053	.235**	.119**	1												
Q22h	-.029	.045	-.022	-.011	-.064	-.124**	-.194**	1											
Q22i	.131**	.367**	.251**	.298**	.289**	.276**	-.016	-.071	1										
Q22j	.156**	.269**	.158**	.244**	.349**	.271**	.168**	-.036	.388**	1									
Q22k	-.069	-.148**	-.021	-.172**	-.261**	-.224**	-.286**	.231**	-.198**	-.174**	1								
Q22l	.084**	-.024	.027	.028	-.065	-.170**	-.057	.340**	-.094**	.000	.198**	1							
Q22m	.128**	.252**	.096*	.200**	.259**	.148**	.117**	.002	.236**	.250**	-.085**	.073	1						
Q22n	.143**	.326**	.128**	.345**	.174**	.108**	-.003	.164**	.320**	.236**	-.126**	.124**	.343**	1					
Q22o	.186**	-.066	.126**	-.004	-.060	.002	.017	.087*	-.101*	-.045	.073	.171**	-.005	-.038	1				
Q22p	.063	-.162**	-.119**	-.086*	-.153**	-.094**	-.041	.151**	-.166**	.165**	.136**	-.064	-.057	.122**	1				
Q22q	-.041	-.170**	-.046	-.117**	-.151**	-.204**	-.213**	.153**	-.200**	-.161**	.249**	.131**	-.214**	.080	.120**	1			
Q22r	.090*	.340**	.192**	.303**	.274**	.291**	.089*	-.081	.470**	.336**	-.292**	-.071	.263**	.282**	-.045	-.118**	.154**	1	
Q22s	.027	-.054	-.037	-.109**	-.142**	-.287**	-.169**	.053	-.143**	-.143**	.200**	.235**	-.034	-.087*	.110**	.080	.325**	-.137**	1
Q22t	.092*	.272**	.189**	.181**	.177**	.274**	-.005	-.036	.246**	.142**	-.216**	.193**	.168**	-.009	-.108**	-.074	.364**	-.138**	1

Bolded Items = MORAL IMPERATIVES

Italicized Items = RESISTANCE TO CHANGE

Mean of Items not in either factor = 0.146, variance = 0.11

Q22A		Frequency	Percent	Valid Percent	Cumulative %
Valid	Strongly Disagree	1	.2	.2	.2
	Disagree	14	2.3	2.3	2.5
	Neutral	59	9.7	9.9	12.4
	Agree	388	63.8	65.0	77.4
	Strongly Agree	135	22.2	22.6	100.0
	Total	597	98.2	100.0	
Missing	System	11	1.8		
Total		608	100.0		

Q22B		Frequency	Percent	Valid Percent	Cumulative %
Valid	Strongly Disagree	6	1.0	1.0	1.0
	Disagree	12	2.0	2.0	3.0
	Neutral	65	10.7	10.8	13.8
	Agree	415	68.3	69.2	83.0
	Strongly Agree	102	16.8	17.0	100.0
	Total	600	98.7	100.0	
Missing	System	8	1.3		
Total		608	100.0		

Q22C		Frequency	Percent	Valid Percent	Cumulative %
Valid	Strongly Disagree	17	2.8	2.9	2.9
	Disagree	81	13.3	13.7	16.5
	Neutral	160	26.3	27.0	43.5
	Agree	259	42.6	43.7	87.2
	Strongly Agree	76	12.5	12.8	100.0
	Total	593	97.5	100.0	
Missing	System	15	2.5		
Total		608	100.0		

Q22D		Frequency	Percent	Valid Percent	Cumulative %
Valid	Strongly Disagree	6	1.0	1.0	1.0
	Disagree	32	5.3	5.4	6.4
	Neutral	73	12.0	12.2	18.6
	Agree	354	58.2	59.2	77.8
	Strongly Agree	133	21.9	22.2	100.0
	Total	598	98.4	100.0	
Missing	System	10	1.6		
Total		608	100.0		

Q22E		Frequency	Percent	Valid Percent	Cumulative %
Valid	Disagree	8	1.3	1.3	1.3
	Neutral	43	7.1	7.2	8.5
	Agree	255	41.9	42.5	51.0
	Strongly Agree	294	48.4	49.0	100.0
	Total	600	98.7	100.0	
Missing	System	8	1.3		
Total		608	100.0		

Q22F		Frequency	Percent	Valid Percent	Cumulative %
Valid	Strongly Disagree	7	1.2	1.2	1.2
	Disagree	30	4.9	5.1	6.2
	Neutral	97	16.0	16.4	22.6
	Agree	292	48.0	49.2	71.8
	Strongly Agree	167	27.5	28.2	100.0
	Total	593	97.5	100.0	
Missing	System	15	2.5		
Total		608	100.0		

Q22G RC		Frequency	Percent	Valid Percent	Cumulative %
Valid	Strongly Disagree	12	2.0	2.0	2.0
	Disagree	28	4.6	4.7	6.7
	Neutral	82	13.5	13.8	20.5
	Agree	321	52.8	53.9	74.3
	Strongly Agree	153	25.2	25.7	100.0
	Total	596	98.0	100.0	
Missing	System	12	2.0		
Total		608	100.0		

Q22H		Frequency	Percent	Valid Percent	Cumulative %
Valid	Strongly Disagree	30	4.9	5.1	5.1
	Disagree	130	21.4	22.2	27.3
	Neutral	229	37.7	39.1	66.4
	Agree	172	28.3	29.4	95.7
	Strongly Agree	25	4.1	4.3	100.0
	Total	586	96.4	100.0	
Missing	System	22	3.6		
Total		608	100.0		

Q22I		Frequency	Percent	Valid Percent	Cumulative %
Valid	Strongly Disagree	4	.7	.7	.7
	Disagree	26	4.3	4.4	5.1
	Neutral	125	20.6	21.1	26.2
	Agree	341	56.1	57.6	83.8
	Strongly Agree	96	15.8	16.2	100.0
	Total	592	97.4	100.0	
Missing	System	16	2.6		
Total		608	100.0		

Q22J		Frequency	Percent	Valid Percent	Cumulative %
Valid	Strongly Disagree	8	1.3	1.3	1.3
	Disagree	5	.8	.8	2.2
	Neutral	22	3.6	3.7	5.9
	Agree	296	48.7	49.7	55.5
	Strongly Agree	265	43.6	44.5	100.0
	Total	596	98.0	100.0	
Missing	System	12	2.0		
Total		608	100.0		

Q22K		Frequency	Percent	Valid Percent	Cumulative %
Valid	Strongly Disagree	201	33.1	33.7	33.7
	Disagree	280	46.1	46.9	80.6
	Neutral	75	12.3	12.6	93.1
	Agree	30	4.9	5.0	98.2
	Strongly Agree	11	1.8	1.8	100.0
	Total	597	98.2	100.0	
Missing	System	11	1.8		
Total		608	100.0		

Q22L		Frequency	Percent	Valid Percent	Cumulative %
Valid	Strongly Disagree	8	1.3	1.3	1.3
	Disagree	67	11.0	11.3	12.6
	Neutral	174	28.6	29.2	41.8
	Agree	296	48.7	49.7	91.6
	Strongly Agree	50	8.2	8.4	100.0
	Total	595	97.9	100.0	
Missing	System	13	2.1		
Total		608	100.0		

Q22M		Frequency	Percent	Valid Percent	Cumulative %
Valid	Strongly Disagree	7	1.2	1.2	1.2
	Disagree	21	3.5	3.6	4.8
	Neutral	56	9.2	9.5	14.3
	Agree	357	58.7	60.7	75.0
	Strongly Agree	147	24.2	25.0	100.0
	Total	588	96.7	100.0	
Missing	System	20	3.3		
Total		608	100.0		

Q22N		Frequency	Percent	Valid Percent	Cumulative %
Valid	Strongly Disagree	3	.5	.5	.5
	Disagree	24	3.9	4.1	4.6
	Neutral	87	14.3	14.8	19.5
	Agree	414	68.1	70.6	90.1
	Strongly Agree	58	9.5	9.9	100.0
	Total	586	96.4	100.0	
Missing	System	22	3.6		
Total		608	100.0		

Q22O		Frequency	Percent	Valid Percent	Cumulative %
Valid	Strongly Disagree	16	2.6	2.7	2.7
	Disagree	91	15.0	15.6	18.3
	Neutral	264	43.4	45.1	63.4
	Agree	191	31.4	32.6	96.1
	Strongly Agree	23	3.8	3.9	100.0
	Total	585	96.2	100.0	
Missing	System	23	3.8		
Total		608	100.0		

Q22P		Frequency	Percent	Valid Percent	Cumulative %
Valid	Strongly Disagree	59	9.7	10.1	10.1
	Disagree	211	34.7	36.1	46.2
	Neutral	196	32.2	33.6	79.8
	Agree	97	16.0	16.6	96.4
	Strongly Agree	21	3.5	3.6	100.0
	Total	584	96.1	100.0	
Missing	System	24	3.9		
Total		608	100.0		

Q22Q		Frequency	Percent	Valid Percent	Cumulative %
Valid	Strongly Disagree	85	14.0	14.7	14.7
	Disagree	306	50.3	52.9	67.6
	Neutral	120	19.7	20.8	88.4
	Agree	59	9.7	10.2	98.6
	Strongly Agree	8	1.3	1.4	100.0
	Total	578	95.1	100.0	
Missing	System	30	4.9		
Total		608	100.0		

Q22R		Frequency	Percent	Valid Percent	Cumulative %
Valid	Strongly Disagree	13	2.1	2.2	2.2
	Disagree	15	2.5	2.5	4.7
	Neutral	86	14.1	14.6	19.3
	Agree	338	55.6	57.3	76.6
	Strongly Agree	138	22.7	23.4	100.0
	Total	590	97.0	100.0	
Missing	System	18	3.0		
Total		608	100.0		

Q22S		Frequency	Percent	Valid Percent	Cumulative %
Valid	Strongly Disagree	61	10.0	10.4	10.4
	Disagree	240	39.5	40.8	51.2
	Neutral	178	29.3	30.3	81.5
	Agree	95	15.6	16.2	97.6
	Strongly Agree	14	2.3	2.4	100.0
	Total	588	96.7	100.0	
Missing	System	20	3.3		
Total		608	100.0		

Q22T		Frequency	Percent	Valid Percent	Cumulative %
Valid	Strongly Disagree	14	2.3	2.4	2.4
	Disagree	71	11.7	12.1	14.5
	Neutral	169	27.8	28.8	43.3
	Agree	253	41.6	43.2	86.5
	Strongly Agree	79	13.0	13.5	100.0
	Total	586	96.4	100.0	
Missing	System	22	3.6		
Total		608	100.0		

			Q22AREDU			Total
			2.00	3.00	4.00	
Cluster Membership	1	Count	11	35	273	319
		% Within Cluster Membership	3.4%	11.0%	85.6%	100.0%
	2	Count	4	24	249	277
		% Within Cluster Membership	1.4%	8.7%	89.9%	100.0%
Total		Count	15	59	522	596
		% Within Cluster Membership	2.5%	9.9%	87.6%	100.0%
Chi-Square Tests		Value	df		Asymp. Sig. (2-sided)	
Pearson Chi-Square		3.479	2		.176	
Likelihood Ratio		3.602	2		.165	
Linear-by-Linear Association		3.329	1		.068	
N of Valid Cases		596				

0 cells (.0%) have expected count less than 5. The minimum expected count is 6.97.

			Q22BREdu			Total
			2.00	3.00	4.00	
Cluster Membership	1	Count	12	47	261	320
		% Within Cluster Membership	3.8%	14.7%	81.6%	100.0%
	2	Count	5	18	255	278
		% Within Cluster Membership	1.8%	6.5%	91.7%	100.0%
Total		Count	17	65	516	598
		% Within Cluster Membership	2.8%	10.9%	86.3%	100.0%
Chi-Square Tests		Value	df		Asymp. Sig. (2-sided)	
Pearson Chi-Square		13.005	2		.001	
Likelihood Ratio		13.493	2		.001	
Linear-by-Linear Association		11.179	1		.001	
N of Valid Cases		598				

0 cells (.0%) have expected count less than 5. The minimum expected count is 7.90.

			Q22CREDU			Total
			2.00	3.00	4.00	
Cluster Membership	1	Count	54	95	169	318
		% Within Cluster Membership	17.0%	29.9%	53.1%	100.0%
	2	Count	44	65	166	275
		% Within Cluster Membership	16.0%	23.6%	60.4%	100.0%
Total		Count	98	160	335	593
		% Within Cluster Membership	16.5%	27.0%	56.5%	100.0%
Chi-Square Tests		Value	df		Asymp. Sig. (2-sided)	
Pearson Chi-Square		3.573	2		.168	
Likelihood Ratio		3.587	2		.166	
Linear-by-Linear Association		1.735	1		.188	
N of Valid Cases		593				

0 cells (.0%) have expected count less than 5. The minimum expected count is 45.45.

			Q22DREDU			Total
			2.00	3.00	4.00	
Cluster Membership	1	Count	23	46	250	319
		% Within Cluster Membership	7.2%	14.4%	78.4%	100.0%
	2	Count	15	27	236	278
		% Within Cluster Membership	5.4%	9.7%	84.9%	100.0%
Total		Count	38	73	486	597
		% Within Cluster Membership	6.4%	12.2%	81.4%	100.0%
Chi-Square Tests		Value	df		Asymp. Sig. (2-sided)	
Pearson Chi-Square		4.237	2		.120	
Likelihood Ratio		4.285	2		.117	
Linear-by-Linear Association		3.276	1		.070	
N of Valid Cases		597				

0 cells (.0%) have expected count less than 5. The minimum expected count is 17.70.

			Q22EREDU			Total
			2.00	3.00	4.00	
Cluster Membership	1	Count	5	32	283	320
		% Within Cluster Membership	1.6%	10.0%	88.4%	100.0%
	2	Count	3	11	265	279
		% Within Cluster Membership	1.1%	3.9%	95.0%	100.0%
Total		Count	8	43	548	599
		% Within Cluster Membership	1.3%	7.2%	91.5%	100.0%
Chi-Square Tests		Value	df		Asymp. Sig. (2-sided)	
Pearson Chi-Square		8.581	2		.014	
Likelihood Ratio		8.996	2		.011	
Linear-by-Linear Association		6.370	1		.012	
N of Valid Cases		599				

0 cells (.0%) have expected count less than 5. The minimum expected count is 3.73.

			Q22FREDU			Total
			2.00	3.00	4.00	
Cluster Membership	1	Count	26	72	219	317
		% Within Cluster Membership	8.2%	22.7%	69.1%	100.0%
	2	Count	11	25	240	276
		% Within Cluster Membership	4.0%	9.1%	87.0%	100.0%
Total		Count	37	97	459	593
		% Within Cluster Membership	6.2%	16.4%	77.4%	100.0%
Chi-Square Tests		Value	df		Asymp. Sig. (2-sided)	
Pearson Chi-Square		27.110	2		.000	
Likelihood Ratio		28.144	2		.000	
Linear-by-Linear Association		21.776	1		.000	
N of Valid Cases		593				

0 cells (.0%) have expected count less than 5. The minimum expected count is 17.22.

			Q22GREDU			Total
			2.00	3.00	4.00	
Cluster Membership	1	Count	32	55	233	320
		% Within Cluster Membership	10.0%	17.2%	72.8%	100.0%
	2	Count	8	27	241	276
		% Within Cluster Membership	2.9%	9.8%	87.3%	100.0%
Total		Count	40	82	474	596
		% Within Cluster Membership	6.7%	13.8%	79.5%	100.0%
Chi-Square Tests		Value	df		Asymp. Sig. (2-sided)	
Pearson Chi-Square		20.962	2		.000	
Likelihood Ratio		22.059	2		.000	
Linear-by-Linear Association		20.795	1		.000	
N of Valid Cases		596				

0 cells (.0%) have expected count less than 5. The minimum expected count is 18.52.

			Q22HREDU			Total
			2.00	3.00	4.00	
Cluster Membership	1	Count	11	126	182	319
		% Within Cluster Membership	3.4%	39.5%	57.1%	100.0%
	2	Count	149	103	15	267
		% Within Cluster Membership	55.8%	38.6%	5.6%	100.0%
Total		Count	160	229	197	586
		% Within Cluster Membership	27.3%	39.1%	33.6%	100.0%
Chi-Square Tests		Value	df		Asymp. Sig. (2-sided)	
Pearson Chi-Square		260.339	2		.000	
Likelihood Ratio		306.392	2		.000	
Linear-by-Linear Association		258.270	1		.000	
N of Valid Cases		586				

0 cells (.0%) have expected count less than 5. The minimum expected count is 72.90.

			Q22IREDU			Total
			2.00	3.00	4.00	
Cluster Membership	1	Count	19	92	207	318
		% Within Cluster Membership	6.0%	28.9%	65.1%	100.0%
	2	Count	11	33	230	274
		% Within Cluster Membership	4.0%	12.0%	83.9%	100.0%
Total		Count	30	125	437	592
		% Within Cluster Membership	5.1%	21.1%	73.8%	100.0%
Chi-Square Tests		Value	df		Asymp. Sig. (2-sided)	
Pearson Chi-Square		28.077	2		.000	
Likelihood Ratio		29.084	2		.000	
Linear-by-Linear Association		20.119	1		.000	
N of Valid Cases		592				

0 cells (.0%) have expected count less than 5. The minimum expected count is 13.89.

			Q22JREDU			Total
			2.00	3.00	4.00	
Cluster Membership	1	Count	5	17	297	319
		% Within Cluster Membership	1.6%	5.3%	93.1%	100.0%
	2	Count	8	5	263	276
		% Within Cluster Membership	2.9%	1.8%	95.3%	100.0%
Total		Count	13	22	560	595
		% Within Cluster Membership	2.2%	3.7%	94.1%	100.0%
Chi-Square Tests		Value	df		Asymp. Sig. (2-sided)	
Pearson Chi-Square		6.227	2		.044	
Likelihood Ratio		6.570	2		.037	
Linear-by-Linear Association		.092	1		.762	
N of Valid Cases		595				

0 cells (.0%) have expected count less than 5. The minimum expected count is 6.03.

			Q22KREDU			Total
			2.00	3.00	4.00	
Cluster Membership	1	Count	209	70	41	320
		% Within Cluster Membership	65.3%	21.9%	12.8%	100.0%
	2	Count	272	5		277
		% Within Cluster Membership	98.2%	1.8%		100.0%
Total		Count	481	75	41	597
		% Within Cluster Membership	80.6%	12.6%	6.9%	100.0%
Chi-Square Tests		Value	df		Asymp. Sig. (2-sided)	
Pearson Chi-Square		103.022	2		.000	
Likelihood Ratio		129.246	2		.000	
Linear-by-Linear Association		93.456	1		.000	
N of Valid Cases		597				

0 cells (.0%) have expected count less than 5. The minimum expected count is 19.02.

			Q22LREDU			Total
			2.00	3.00	4.00	
Cluster Membership	1	Count	4	52	264	320
		% Within Cluster Membership	1.3%	16.3%	82.5%	100.0%
	2	Count	71	122	82	275
		% Within Cluster Membership	25.8%	44.4%	29.8%	100.0%
Total		Count	75	174	346	595
		% Within Cluster Membership	12.6%	29.2%	58.2%	100.0%
Chi-Square Tests		Value	df		Asymp. Sig. (2-sided)	
Pearson Chi-Square		181.382	2		.000	
Likelihood Ratio		199.033	2		.000	
Linear-by-Linear Association		176.182	1		.000	
N of Valid Cases		595				

0 cells (.0%) have expected count less than 5. The minimum expected count is 34.66.

			Q22MREDU			Total
			2.00	3.00	4.00	
Cluster Membership	1	Count	14	37	260	311
		% Within Cluster Membership	4.5%	11.9%	83.6%	100.0%
	2	Count	14	19	241	274
		% Within Cluster Membership	5.1%	6.9%	88.0%	100.0%
Total		Count	28	56	501	585
		% Within Cluster Membership	4.8%	9.6%	85.6%	100.0%
Chi-Square Tests		Value	df		Asymp. Sig. (2-sided)	
Pearson Chi-Square		4.183	2		.124	
Likelihood Ratio		4.269	2		.118	
Linear-by-Linear Association		.815	1		.367	
N of Valid Cases		585				

0 cells (.0%) have expected count less than 5. The minimum expected count is 13.11.

			Q22NREDU			Total
			2.00	3.00	4.00	
Cluster Membership	1	Count	18	44	248	310
		% Within Cluster Membership	5.8%	14.2%	80.0%	100.0%
	2	Count	9	43	221	273
		% Within Cluster Membership	3.3%	15.8%	81.0%	100.0%
Total		Count	27	87	469	583
		% Within Cluster Membership	4.6%	14.9%	80.4%	100.0%
Chi-Square Tests		Value	df		Asymp. Sig. (2-sided)	
Pearson Chi-Square		2.227	2		.328	
Likelihood Ratio		2.275	2		.321	
Linear-by-Linear Association		.629	1		.428	
N of Valid Cases		583				

0 cells (.0%) have expected count less than 5. The minimum expected count is 12.64.

			Q22OREDU			Total
			2.00	3.00	4.00	
Cluster Membership	1	Count	57	120	134	311
		% Within Cluster Membership	18.3%	38.6%	43.1%	100.0%
	2	Count	49	144	78	271
		% Within Cluster Membership	18.1%	53.1%	28.8%	100.0%
Total		Count	106	264	212	582
		% Within Cluster Membership	18.2%	45.4%	36.4%	100.0%
Chi-Square Tests		Value	df		Asymp. Sig. (2-sided)	
Pearson Chi-Square		14.899	2		.001	
Likelihood Ratio		15.007	2		.001	
Linear-by-Linear Association		5.567	1		.018	
N of Valid Cases		582				

0 cells (.0%) have expected count less than 5. The minimum expected count is 49.36.

			Q22PREDU			Total
			2.00	3.00	4.00	
Cluster Membership	1	Count	122	110	76	308
		% Within Cluster Membership	39.6%	35.7%	24.7%	100.0%
	2	Count	148	85	40	273
		% Within Cluster Membership	54.2%	31.1%	14.7%	100.0%
Total		Count	270	195	116	581
		% Within Cluster Membership	46.5%	33.6%	20.0%	100.0%
Chi-Square Tests		Value	df		Asymp. Sig. (2-sided)	
Pearson Chi-Square		14.827	2		.001	
Likelihood Ratio		14.971	2		.001	
Linear-by-Linear Association		14.746	1		.000	
N of Valid Cases		581				

0 cells (.0%) have expected count less than 5. The minimum expected count is 54.51.

			Q22QREDU			Total
			2.00	3.00	4.00	
Cluster Membership	1	Count	176	82	47	305
		% Within Cluster Membership	57.7%	26.9%	15.4%	100.0%
	2	Count	213	38	19	270
		% Within Cluster Membership	78.9%	14.1%	7.0%	100.0%
Total		Count	389	120	66	575
		% Within Cluster Membership	67.7%	20.9%	11.5%	100.0%
Chi-Square Tests		Value	df		Asymp. Sig. (2-sided)	
Pearson Chi-Square		29.510	2		.000	
Likelihood Ratio		30.172	2		.000	
Linear-by-Linear Association		26.253	1		.000	
N of Valid Cases		575				

0 cells (.0%) have expected count less than 5. The minimum expected count is 30.99.

			Q22RREDU			Total
			2.00	3.00	4.00	
Cluster Membership	1	Count	18	65	227	310
		% Within Cluster Membership	5.8%	21.0%	73.2%	100.0%
	2	Count	9	21	245	275
		% Within Cluster Membership	3.3%	7.6%	89.1%	100.0%
Total		Count	27	86	472	585
		% Within Cluster Membership	4.6%	14.7%	80.7%	100.0%
Chi-Square Tests		Value	df		Asymp. Sig. (2-sided)	
Pearson Chi-Square		24.191	2		.000	
Likelihood Ratio		25.263	2		.000	
Linear-by-Linear Association		17.950	1		.000	
N of Valid Cases		585				

0 cells (.0%) have expected count less than 5. The minimum expected count is 12.69.

			Q22SREDU			Total
			2.00	3.00	4.00	
Cluster Membership	1	Count	139	97	74	310
		% Within Cluster Membership	44.8%	31.3%	23.9%	100.0%
	2	Count	160	81	34	275
		% Within Cluster Membership	58.2%	29.5%	12.4%	100.0%
Total		Count	299	178	108	585
		% Within Cluster Membership	51.1%	30.4%	18.5%	100.0%
Chi-Square Tests		Value	df		Asymp. Sig. (2-sided)	
Pearson Chi-Square		15.690	2		.000	
Likelihood Ratio		15.995	2		.000	
Linear-by-Linear Association		15.249	1		.000	
N of Valid Cases		585				

0 cells (.0%) have expected count less than 5. The minimum expected count is 50.77.

			Q22TREDU			Total
			2.00	3.00	4.00	
Cluster Membership	1	Count	58	94	157	309
		% Within Cluster Membership	18.8%	30.4%	50.8%	100.0%
	2	Count	26	75	173	274
		% Within Cluster Membership	9.5%	27.4%	63.1%	100.0%
Total		Count	84	169	330	583
		% Within Cluster Membership	14.4%	29.0%	56.6%	100.0%
Chi-Square Tests		Value	df		Asymp. Sig. (2-sided)	
Pearson Chi-Square		13.048	2		.001	
Likelihood Ratio		13.318	2		.001	
Linear-by-Linear Association		12.725	1		.000	
N of Valid Cases		583				

0 cells (.0%) have expected count less than 5. The minimum expected count is 39.48.

Appendix F:

BMP Analysis

BMP Results and Preferences									
Total Sample		Would Not Support	Might Support	Would Support	Strongly Support	Would and Strongly	Do Not Know	No Response	Total
Q20a	Frequency	21	98	193	239		36	21	608
	Valid Percent	3.5	16.1	31.7	39.3	71	5.9	3.5	100
Q20b	Frequency	53	163	216	118		39	19	608
	Valid Percent	8.7	26.8	35.5	19.4	54.9	6.4	3.1	100
Q20c	Frequency	16	65	238	241		30	18	608
	Valid Percent	2.6	10.7	39.1	39.6	78.7	4.9	3	100
Q20d	Frequency	10	42	151	376		16	13	608
	Valid Percent	1.6	6.9	24.8	61.8	86.6	2.6	2.1	100
Q20e	Frequency	21	60	206	286		19	16	608
	Valid Percent	3.5	9.9	33.9	47	80.9	3.1	2.6	100
Q20f	Frequency	12	75	260	227		17	17	608
	Valid Percent	2	12.3	42.8	37.3	80.1	2.8	2.8	100
Q20g	Frequency	9	72	278	210		23	16	608
	Valid Percent	1.5	11.8	45.7	34.5	80.2	3.8	2.6	100

Individualist Cluster		Would Not Support	Might Support	Would Support	Strongly Support	Would and Strongly	Do Not Know	No Response	Total
Q20a	Frequency	16	59	115	91		31	8	320
	Valid Percent	5	18.4	35.9	28.4	64.3	9.7	2.5	100
Q20b	Frequency	31	93	120	42		26	8	320
	Valid Percent	9.7	29.1	37.5	13.1	50.6	8.1	2.5	100
Q20c	Frequency	13	48	135	99		20	5	320
	Valid Percent	4.1	15	42.2	30.9	73.1	6.3	1.6	100
Q20d	Frequency	8	33	90	173		12	4	320
	Valid Percent	2.5	10.3	28.1	54.1	82.2	3.8	1.3	100
Q20e	Frequency	19	48	117	116		16	4	320
	Valid Percent	5.9	15	36.6	36.3	72.9	5	1.3	100
Q20f	Frequency	8	48	142	104		13	5	320
	Valid Percent	2.5	15	44.4	32.5	76.9	4.1	1.6	100
Q20g	Frequency	5	41	161	93		15	5	320
	Valid Percent	1.6	12.8	50.3	29.1	79.4	4.7	1.6	100

Egalitarian Cluster		Would Not Support	Might Support	Would Support	Strongly Support	Would and Strongly	Do Not Know	No Response	Total
Q20a	Frequency	5	38	78	148		4	6	279
	Valid Percent	1.8	13.6	28	53	81	1.4	2.2	100
Q20b	Frequency	22	69	96	76		13	3	279
	Valid Percent	7.9	24.7	34.4	27.2	61.6	4.7	1.1	100
Q20c	Frequency	2	17	103	142		9	6	279
	Valid Percent	0.7	6.1	36.9	50.9	87.8	3.2	2.2	100
Q20d	Frequency	2	8	61	202		4	2	279
	Valid Percent	0.7	2.9	21.9	72.4	94.3	1.4	0.7	100
Q20e	Frequency	1	12	89	170		3	4	279
	Valid Percent	0.4	4.3	31.9	60.9	92.8	1.1	1.4	100
Q20f	Frequency	4	26	118	123		4	4	279
	Valid Percent	1.4	9.3	42.3	44.1	86.4	1.4	1.4	100
Q20g	Frequency	4	30	117	117		7	4	279
	Valid Percent	1.4	10.8	41.9	41.9	83.8	2.5	1.4	100

Independent Samples Test of BMP at .01 Level of Significance										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	99% Confidence Interval of the Difference	
									Lower	Upper
Q20A1	Equal variances assumed	1.051	.306	-5.214	548	.000	-.3717	.07130	-.55603	-.1875
	Equal variances not assumed			-5.225	546.476	.000	-.3717	.07115	-.55565	-.1878
Q20B1	Equal variances assumed	.242	.623	-3.312	547	.001	-.2544	.07681	-.45296	-.0559
	Equal variances not assumed			-3.302	533.990	.001	-.2544	.07704	-.45358	-.0553
Q20C1	Equal variances assumed	.721	.396	-5.926	557	.000	-.3736	.06304	-.53653	-.2106
	Equal variances not assumed			-6.000	549.643	.000	-.3736	.06226	-.53452	-.2126
Q20D1	Equal variances assumed	51.958	.000	-5.012	575	.000	-.2881	.05747	-.43661	-.1395
	Equal variances not assumed			-5.101	547.945	.000	-.2881	.05648	-.43406	-.1421
Q20E1	Equal variances assumed	19.459	.000	-7.394	570	.000	-.4735	.06404	-.63905	-.3080
	Equal variances not assumed			-7.533	526.218	.000	-.4735	.06286	-.63604	-.3110
Q20F1	Equal variances assumed	.113	.737	-3.156	571	.002	-.1960	.06210	-.35645	-.0355
	Equal variances not assumed			-3.170	570.630	.002	-.1960	.06182	-.35573	-.0362
Q20G1	Equal variances assumed	5.410	.020	-2.582	566	.010	-.1548	.05994	-.30969	.0001
	Equal variances not assumed			-2.578	555.067	.010	-.1548	.06003	-.30994	.0004

Appendix G:

Regression Analysis Output

Sample Population Results

Descriptive Statistics

	Mean	Std. Deviation	N
INTENT1	3.2345	.53775	496
KNOWALL	2.7883	.95428	496
GROUP	.5020	.50050	496
LOC	3.6649	.58922	496
PERSONAL	3.7730	.60779	496
Q23	33.8931	18.96306	496
Q24	16.0464	13.93092	496
Q26	4.02	1.324	496
Q27	3.48	1.054	496
Q28	6.24	2.049	496

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.557	.310	.297	.45077

Predictors: (Constant), Q28, LOC, Q26, KNOWALL, GROUP, Q27, PERSONAL, Q24, Q23

Dependent Variable: INTENT1

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	44.388	9	4.932	24.272	.000
	Residual	98.753	486	.203		
	Total	143.141	495			

Predictors: (Constant), Q28, LOC, Q26, KNOWALL, GROUP, Q27, PERSONAL, Q24, Q23

Dependent Variable: INTENT1

Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
Model 1	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	1.336	.188		7.116	.000	.967	1.705
KNOWALL	-5.030E-03	.022	-.009	-.227	.821	-.049	.039
GROUP	.148	.043	.137	3.426	.001	.063	.232
LOC	.324	.039	.355	8.310	.000	.247	.400
PERSONAL	.158	.039	.179	4.070	.000	.082	.234
Q23	-1.071E-03	.002	-.038	-.686	.493	-.004	.002
Q24	-2.322E-03	.002	-.060	-1.111	.267	-.006	.002
Q26	-1.065E-02	.022	-.026	-.492	.623	-.053	.032
Q27	4.816E-02	.023	.094	2.090	.037	.003	.093
Q28	6.289E-04	.011	.002	.059	.953	-.020	.022

Dependent Variable: INTENT1

Residual Statistics (dependent variable: INTENT1)

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
Model 1	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	1.336	.188		7.116	.000	.967	1.705
KNOWALL	-5.030E-03	.022	-.009	-.227	.821	-.049	.039
GROUP	.148	.043	.137	3.426	.001	.063	.232
LOC	.324	.039	.355	8.310	.000	.247	.400
PERSONAL	.158	.039	.179	4.070	.000	.082	.234
Q23	-1.071E-03	.002	-.038	-.686	.493	-.004	.002
Q24	-2.322E-03	.002	-.060	-1.111	.267	-.006	.002
Q26	-1.065E-02	.022	-.026	-.492	.623	-.053	.032
Q27	4.816E-02	.023	.094	2.090	.037	.003	.093
Q28	6.289E-04	.011	.002	.059	.953	-.020	.022

Cluster 1: Individualists

Descriptive Statistics

	Mean	Std. Deviation	N
INTENT1	3.0596	.57121	320
KNOWALL	2.6406	.98208	320
MORAL1	3.8153	.52211	320
RESIST1	3.3010	.40889	320
LOC	3.5689	.63913	320
PERSONAL	3.6275	.59496	320
GROUP	.0000	.00000	320
Q23	39.0280	18.95577	320
Q24	20.9189	15.79435	320
Q26	4.33	1.312	320
Q27	3.22	1.053	320
Q28	6.04	1.977	320

Model Summary

	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
Model					R Square Change	F Change	df1	df2	Sig. F Change
1	.563	.317	.295	.47964	.317	14.344	10	309	.000

Predictors: (Constant), Q28, Q24, PERSONAL, RESIST1, KNOWALL, Q27, MORAL1, LOC, Q23, Q26

Dependent Variable: INTENT1

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	32.999	10	3.300	14.344	.000
	Residual	71.086	309	.230		
	Total	104.085	319			

Predictors: (Constant), Q28, Q24, PERSONAL, RESIST1, KNOWALL, Q27, MORAL1, LOC, Q23, Q26

Dependent Variable: INTENT1

Coefficients

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	1.463	.338		4.325	.000
	KNOWALL	-3.911E-02	.029	-.067	-1.351	.178
	MORAL1	.352	.060	.322	5.828	.000
	RESIST1	-.172	.068	-.123	-2.523	.012
	LOC	.290	.052	.324	5.580	.000
	PERSONAL	1.714E-02	.057	.018	.301	.764
	Q23	-7.751E-04	.002	-.026	-.375	.708
	Q24	9.441E-04	.003	.026	.363	.717
	Q26	-5.537E-02	.030	-.127	-1.842	.066
	Q27	2.297E-02	.030	.042	.761	.447
	Q28	7.620E-04	.015	.003	.051	.959

Dependent Variable: INTENT1

Residual Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.0310	3.8620	3.0596	.32163	320
Std. Predicted Value	-3.198	2.495	.000	1.000	320
Standard Error of Predicted Value	.04432	.16521	.08639	.02111	320
Adjusted Predicted Value	1.9828	3.8664	3.0586	.32267	320
Residual	-1.6707	1.3591	.0000	.47206	320
Std. Residual	-3.483	2.834	.000	.984	320
Stud. Residual	-3.527	2.882	.001	1.003	320
Deleted Residual	-1.7125	1.4058	.0010	.48994	320
Stud. Deleted Residual	-3.594	2.917	.000	1.007	320
Mahal. Distance	1.727	36.850	9.969	5.623	320
Cook's Distance	.000	.056	.003	.006	320
Centered Leverage Value	.005	.116	.031	.018	320

Dependent Variable: INTENT1

Cluster 2: Egalitarians

Descriptive Statistics

	Mean	Std. Deviation	N
INTENT1	3.3622	.47909	279
KNOWALL	2.8566	.94501	279
MORAL1	4.0207	.45336	279
RESIST1	2.2461	.41451	279
LOC	3.7307	.50986	279
PERSONAL	3.8806	.56444	279
Q23	30.8974	18.61404	279
Q24	13.4420	12.59847	279
Q26	3.80	1.306	279
Q27	3.68	1.018	279
Q28	6.49	1.911	279

Model Summary

	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
Model					R Square Change	F Change	df1	df2	Sig. F Change
1	.555	.308	.282	.40591	.308	11.926	10	268	.000

Predictors: (Constant), Q28, LOC, Q26, RESIST1, KNOWALL, MORAL1, Q27, PERSONAL, Q24, Q23

Dependent Variable: INTENT1

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.650	10	1.965	11.926	.000
	Residual	44.157	268	.165		
	Total	63.808	278			

Predictors: (Constant), Q28, LOC, Q26, RESIST1, KNOWALL, MORAL1, Q27, PERSONAL, Q24, Q23

Dependent Variable: INTENT1

Coefficients

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	.794	.340		2.339	.020
	KNOWALL	-9.398E-03	.027	-.019	-.351	.726
	MORAL1	.259	.057	.245	4.571	.000
	RESIST1	-2.022E-02	.060	-.017	-.339	.735
	LOC	.256	.052	.272	4.883	.000
	PERSONAL	.104	.048	.122	2.139	.033
	Q23	-3.143E-06	.002	.000	-.002	.999
	Q24	-2.174E-03	.003	-.057	-.825	.410
	Q26	-2.471E-02	.026	-.067	-.943	.347
	Q27	9.313E-02	.029	.198	3.262	.001
	Q28	3.500E-03	.014	.014	.257	.797

Dependent Variable: INTENT1

Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.1044	4.0493	3.3622	.26586	279
Std. Predicted Value	-4.731	2.585	.000	1.000	279
Standard Error of Predicted Value	.03719	.22182	.07791	.02069	279
Adjusted Predicted Value	1.7231	4.0861	3.3608	.27335	279
Residual	-1.7356	1.1130	.0000	.39855	279
Std. Residual	-4.276	2.742	.000	.982	279
Stud. Residual	-4.402	2.806	.002	1.007	279
Deleted Residual	-1.8392	1.2769	.0014	.41972	279
Stud. Deleted Residual	-4.561	2.843	.001	1.013	279
Mahal. Distance	1.337	82.025	9.964	7.163	279
Cook's Distance	.000	.269	.005	.019	279
Centered Leverage Value	.005	.295	.036	.026	279

Dependent Variable: INTENT1

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