DISSERTATION

A BROADER CONTEXT FOR UNDERSTANDING THE BASIS FOR AND APPLICATION OF WILDLIFE VALUE ORIENTATIONS

Submitted by:

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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY TARA L. TEEL ENTITLED A BROADER CONTEXT FOR UNDERSTANDING THE BASIS FOR AND APPLICATION OF WILDLIFE VALUE ORIENTATIONS BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

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ABSTRACT OF DISSERTATION

A BROADER CONTEXT FOR UNDERSTANDING THE BASIS FOR AND APPLICATION OF WILDLIFE VALUE ORIENTATIONS

This dissertation presents two papers that contribute to our theoretical understanding and application of the concept of wildlife value orientations. The concept has emerged as a way of representing the diversity of values that people hold toward wildlife. It has been applied in a number of contexts, but little attention has been devoted to understanding the basis for wildlife value orientations and to determining if they are somehow linked, at a broader level, to cultural and environmental forces. This dissertation uses data from a survey of residents in six western states to address these issues.

The first paper builds upon prior research which suggests wildlife value orientations are part of an individual's hierarchical belief structure. Specifically, they are believed to be based on fundamental values and to in turn form a foundation for more specific wildlife-related attitudes and behaviors. In exploring the extent to which wildlife value orientations are related to other cognitions, paper one reveals a relationship between a utilitarian versus protection orientation toward wildlife and Materialist/Post-Materialist values. Individuals with a Materialist value set were more likely than Post-Materialists to have a utilitarian orientation toward wildlife. Paper one also demonstrates the predictive validity of an overall model containing both values and wildlife value orientations in explaining variation in support for wildlife management actions.

The second paper expands upon the notion that wildlife value orientations are part of a broader cultural context. It applies the concept of wildlife value orientations as well as Materialist theories of cultural change to explore the factors that may be related to declines in hunting participation in the U.S. The paper examines the relationship between hunting and certain societal-level factors believed to be indicative of forces associated with modernization and in turn related to value shift in this country. Findings revealed a strong positive relationship between active participation in hunting and possession of traditional values, defined by a Materialist values set and a utilitarian orientation toward wildlife. Results also showed that active participation in hunting is related to urbanization, income, education, and residential stability at the state level.

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I. INTRODUCTION

The concept of wildlife value orientations has emerged as a way of representing the diversity of values that people hold toward wildlife. It has been applied in a number of contexts, with a primary focus on predicting wildlife-related attitudes and behaviors. As an example, studies have examined the utility of wildlife value orientations in explaining variation in public support for wildlife management proposals (e.g., Whittaker, 2000) and in defining participation in wildlife-related recreation activities such as hunting (e.g., Fulton, Manfredo, & Lispcomb, 1996). However, little attention has been devoted to understanding the basis for wildlife value orientations and to determining if they are somehow linked, at a broader level, to cultural and environmental forces that drive societal change, including value shift. This dissertation begins to address these issues and identifies areas necessary for further investigation.

History of the Values Concept in Human Dimensions Research

The values concept has been central to investigations into the human dimensions of wildlife management. For example, it has been used to explain differences in public attitudes toward wildlife issues (Kellert, 1976; Manfredo, Pierce, Fulton, Pate, & Gill, 1999; Purdy & Decker, 1989; Tarrant, Bright, & Cordell, 1997) and participation in wildlife-related recreation (Bryan, 1980; Fulton et al., 1996; Manfredo, Sneegas, Driver, & Bright, 1989) and to determine how wildlife can contribute to the quality of human life (Shaw, 1987). Values information has also been useful in assisting with development of effective communication strategies that target specific segments of the public (e.g., see

Bright, Manfredo, & Fulton, 2000). Understanding values has achieved particular significance in recent years as stakeholder conflict becomes increasingly inherent in contemporary wildlife issues. This conflict, driven in part by shifting public values, is evidenced by waves of recent ballot initiatives that threaten traditional wildlife management practices (Minnis, 1998).

Wildlife values have been defined and measured using the terminology of a number of disciplines including economics, ecology, sociology, and psychology (for examples see Shaw & Zube, 1980). While conceptual clarity in the human dimensions literature is lacking, a few key definitions of values have emerged. Steinhoff (1980) defined values as mental constructs that express the perceived worth or significance of things in relation to other things. Another commonly-cited reference, drawn from psychology, is Rokeach (1973) who defined values as enduring beliefs about preferred modes of conduct or desired end-states of existence. A similar conception is offered by Schwartz (1992), whose psychological research has been applied frequently in the study of environmental beliefs (e.g., see Stern, Dietz, Kalof, & Guagnano, 1995). He defined values as desirable goals that transcend situations, vary in importance, and serve as guiding principles in the life of an individual or other social entity.

As the concept has evolved, human dimensions researchers have come to agree upon certain key characteristics of values. Their importance lies in the central role they play in the hierarchy of cognitions that directs individual behavior (Ajzen & Fishbein, 1980; Homer & Kahle, 1988). In this belief structure, they form the basis for more specific attitudes and behaviors. They are relatively few in number, are formed early on in life, and are highly stable and resistant to change at the individual level (Inglehart,

1990; Rokeach, 1973; Schwartz, 1992). Unlike specific attitudes and other higher order cognitions, values transcend specific situations and are commonly shared among individuals within a culture (Feather, 1990; Inglehart, 1990).

Development of a Theory on Wildlife Value Orientations

Past researchers have identified typologies to represent the broad array of wildlife values and corresponding stakeholder value types. For example, as early as 1947, King identified specific categories of wildlife values including recreational, aesthetic, educational, biological, social, and commercial. Similar classifications based on the different uses of wildlife (Hendee, 1969; Rolston, 1979; Shaw, 1974) and the types of recreation activity engaged in (Hendee, 1974) have also been employed. More recent applications, including Kellert's (1980) typology of attitudes toward animals and Purdy and Decker's (1989) wildlife attitudes and values (WAVS) scale, have been used to identify specific groups of stakeholders on the basis of their wildlife values.

In 1996, Fulton et al. introduced a new classification scheme based on the concept of wildlife value orientations. Their approach has been applied in a number of subsequent studies (e.g., DeRuiter & Donnelly, 2002; Manfredo et al., 1999; Manfredo & Fulton, 1997; Manfredo & Zinn, 1996; Manfredo, Zinn, Sikorowski, & Jones, 1998; Zinn, Manfredo, & Barro, 2002). In this approach, value orientations are a component of an individual's hierarchical belief structure. They are an expression of basic values and are revealed through the pattern and direction of basic beliefs held by an individual (Fulton et al., 1996). Value orientations provide the foundation for an individual's attitudes and norms, which in turn guide their behavior.

Two wildlife value orientation dimensions have been identified empirically – the protection-use orientation and the wildlife appreciation orientation (Bright et al., 2000; Fulton et al., 1996). People classified on the use end of the protection-use scale believe wildlife should be managed and used to benefit humans and are positive toward hunting and fishing. Those on the protection end of the scale believe wildlife should have rights similar to those of humans, and tend to oppose hunting and fishing. People who score high on the wildlife appreciation orientation hold beliefs that emphasize the importance of wildlife education, wildlife-related recreation such as viewing, and wildlife protection for future generations.

Prior research has shown that wildlife value orientations are effective in predicting participation in wildlife-related recreation (Fulton et al., 1996) and that the protection-use orientation is strongly associated with attitudes and behavioral intentions toward wildlife management proposals (Bright et al., 2000; Manfredo et al., 1998; 1999; Manfredo & Fulton, 1997; Manfredo & Zinn, 1996; Whittaker, 2000). While more recent applications (e.g., Teel, Bright, & Manfredo, 2003) have confirmed the predictive validity of the protection-use orientation, they suggest limited practical utility of the wildlife appreciation orientation due to low variance on this measure.

Exploring a Broader Context for Wildlife Value Orientations

Research on wildlife value orientations suggests that the U.S. public is moving away from a traditional, utilitarian focus and becoming more protection-oriented with respect to the resource (Manfredo & Zinn, 1996). Manfredo, Teel, & Bright (2003) indicate that this shift may be related to a broader shift in public values that is occurring as a result of certain societal-level changes.

Materialist theories of cultural change developed in anthropology and sociology contend that broad-scale changes in ideology (e.g., values and value orientations) result from the interplay among a number of cultural and environmental factors, including a society's economic system, technology, demography, institutions, and the environment (Buttel & Humphrey, 2002; Harris, 1999; Smith & Young, 1998). These models identify a number of forces associated with industrialization and the processes that followed (e.g., rapid growth in technology, urbanization, and occupational change) that dramatically altered life in America and in turn had a profound impact on values in this country.

Inglehart (1990, 1997; Inglehart & Baker, 2000) describes how these forces have produced the mix of values evident today. He argues that these values are an adaptation to the cultural changes that have occurred in America in the 20th century. Inglehart's theory, supported by empirical findings in over 65 societies around the world, suggests that changes in societal values in post-industrialized nations are primarily the result of shifting need states. Economic development has elevated people from basic human material needs (e.g., safety, physical security) to higher-order psychological needs which he terms Post-Materialist values (e.g., quality of life, self expression). He argues that changes in values, which are formed at an early age and are relatively stable *within an individual*, occur over time *in a society* as a result of intergenerational shift. Post-Materialist values are spawned by the presence of economic and physical security during one's formative years. Inglehart believes that these values began to take hold in America following World War II when the country's heightened affluence fostered a generation of individuals who now emphasize Post-Materialist concerns.

We might expect that wildlife value orientations, if related to a broader ideology, are adapting in the same way as values to the cultural changes Inglehart describes. In this context, wildlife value orientations are tied to the function they serve in a society (e.g., to support hunting and other wildlife use-related activities), and as needs related to that particular function diminish, the value orientations change. Thus, as material needs (e.g., food) that fostered the development of a utilitarian value orientation toward wildlife are met, the value orientation is gradually replaced by another way of viewing the resource.

Consistent with this argument, Manfredo et al. (2003) have found that some of the factors identified by Inglehart (1990) as driving forces in societal-level value shift (e.g., increasing affluence, education, and urbanization) are related to the representation of certain value and wildlife value orientation types at the state level. Specifically, they revealed that the proportion of "traditionalists" – i.e., those with a Materialist value set and a utilitarian value orientation toward wildlife – within a state was inversely related to education, urbanization, and income levels, and positively related to residential stability.

DISSERTATION ORGANIZATION AND PURPOSE

This dissertation presents two papers derived from the pilot phase of a long-term research program designed to assess values, wildlife value orientations, attitudes toward key wildlife management issues and actions, and participation in wildlife-related recreation activities. Data were collected using self-report mail-back questionnaires administered March–May, 2002 to a random sample of residents in six western states: Alaska, Arizona, Colorado, Idaho, North Dakota, and South Dakota.

The dissertation builds upon two key areas of investigation described above to expand the content and application of wildlife value orientation theory. First, it builds

upon prior research which suggests wildlife value orientations are part of an individual's hierarchical belief structure. They are believed to be based on fundamental values and to in turn form a foundation for more specific wildlife-related attitudes and behaviors. While literature has repeatedly demonstrated the predictive validity of wildlife value orientations in this context, little attention has been paid to the actual relationship between wildlife value orientations and more basic values. I address this gap in the literature in Chapter II by examining the extent to which wildlife value orientations are related to broader values. I also demonstrate in this chapter how an understanding of both constructs (values and wildlife value orientations) can aid in explaining variation in public support for certain wildlife management strategies. Because wildlife value orientations arguably provide a foundation for certain types of wildlife-related attitudes and behaviors, including support for wildlife management actions, we would expect the values underlying the orientations to also aid in the prediction of these concepts.

Drawing from a second line of inquiry which argues that ideology (e.g., values) results from the interplay among a number of cultural and environmental factors, this dissertation extends the notion that wildlife value orientations are shaped and changing in conjunction with broader societal-level forces. The idea is explored in Chapter III in the context of demonstrating how an understanding of cultural changes, including value shift and the factors affecting that shift, can aid in addressing why value orientations toward wildlife might be changing. The focus of the chapter is on developing a broader perspective for understanding trends in hunting participation witnessed at the national level. It applies Materialist theories of cultural change (e.g., see Harris, 1999) in describing how the evolution in the function and meaning of hunting for Americans is

consistent with a shift away from a traditional utilitarian orientation toward wildlife. These changes are also consistent with the satisfaction of basic material needs in our society that has resulted from industrialization and the processes that followed.

To examine hunting in this broader context, I address two main objectives in Chapter III. First, I explore the relationship between active participation in hunting and the representation of certain values and wildlife value orientations at the state level. Second, I determine the extent to which certain societal-level factors – factors that, according to Manfredo et al. (2003), are indicative of the modernization process and are driving value and wildlife value orientation shift – are related to state-level trends in hunting. Evidence of these relationships suggests that wildlife value orientations and the prevalence of related behaviors such as hunting are part of a broader cultural context that demands macro-level investigations and explanations in our research.

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II. EXPLORING THE BASIS FOR WILDLIFE VALUE ORIENTATIONS IN THE CONTEXT OF AN OVERALL MODEL PREDICTING SUPPORT FOR WILDLIFE MANAGEMENT ACTIONS

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ABSTRACT

Since the development of the concept of wildlife value orientations as a means of capturing the broad array of specific values people hold toward wildlife, the focus of subsequent research has primarily been on explaining variation in specific wildlife-related attitudes and behaviors. This research assumes that wildlife value orientations are part of a hierarchical belief structure consisting of several different types of inter-related cognitions. They are thought to be an expression of an individual's more fundamental values and to in turn affect higher-order cognitions, including attitudes, norms, and ultimately behaviors. While research has demonstrated the predictive validity of wildlife value orientations in terms of explaining higher-order attitudes and behaviors, little attention has been paid to understanding the basis for these orientations. This paper tests the extent to which wildlife value orientations are related to more fundamental values. We reveal a relationship between a utilitarian versus protection orientation toward wildlife and Materialist/Post-Materialist values. Individuals with a Materialist value set were more likely than Post-Materialists to have a utilitarian orientation toward wildlife. This paper also examines the predictive validity of an overall model containing both values and wildlife value orientations in explaining variation in support for wildlife management actions.

Key words: attitudes, cognitive hierarchy, materialism, values, wildlife value orientations

INTRODUCTION

The values concept has been central to investigations into the human dimensions of wildlife management. For example, it has been used to explain differences in public attitudes toward wildlife issues (Kellert, 1976; Manfredo, Pierce, Fulton, Pate, & Gill, 1999; Purdy & Decker, 1989; Tarrant, Bright, & Cordell, 1997) and participation in wildlife-related recreation (Bryan, 1980; Fulton, Manfredo, & Lipscomb, 1996; Manfredo, Sneegas, Driver, & Bright, 1989) and to determine how wildlife can contribute to the quality of human life (Shaw, 1987). Values information has also been useful in assisting with development of effective communication strategies that target specific segments of the public (e.g., see Bright, Manfredo, & Fulton, 2000). Understanding values has achieved particular significance in recent years as stakeholder conflict becomes increasingly inherent in contemporary wildlife issues. This conflict, driven in part by shifting public values, is evidenced by waves of recent ballot initiatives that threaten traditional wildlife management practices (Minnis, 1998).

A number of researchers have attempted to develop concepts and typologies that represent the broad array of specific values people hold toward wildlife (e.g., see Hendee, 1969; 1974; King, 1947; Kellert 1980; Purdy & Decker, 1989; Rolston, 1979; Shaw, 1974). The concept of wildlife value orientations has emerged as one approach to capturing this diversity. Introduced through the work of Fulton, Manfredo, and Lipscomb (1996), and tested in a number of subsequent studies (e.g., DeRuiter & Donnelly, 2002; Manfredo et al., 1999; Manfredo & Fulton, 1997; Manfredo & Zinn, 1996; Manfredo, Zinn, Sikorowski, & Jones, 1998; Zinn, Manfredo, & Barro, 2002),

wildlife value orientations are revealed through the pattern and direction of basic beliefs that people hold toward wildlife and wildlife management.

While research has demonstrated the utility of wildlife value orientations in being able to predict certain wildlife-related attitudes and behaviors (e.g., see Manfredo & Zinn, 1996; Whittaker, 2000), little attention has been devoted to understanding the basis for these orientations. Are they related to a broader value set? If so, what types of values are linked to a utilitarian versus a protection orientation toward wildlife? As society purportedly moves away from an emphasis on traditional utilitarian orientations toward the wildlife resource, answers to these questions become increasingly important in aiding our understanding of factors affecting the shift.

In this paper, we begin to address these questions by examining the relationship between wildlife value orientations and more fundamental values. We do this in the context of an overall model that takes into account both constructs in explaining variation in support for wildlife management actions.

Wildlife Value Orientations Defined – Part of a Hierarchical Belief Structure

Value orientations are a component of an individual's hierarchical belief structure (Fulton et al., 1996; Homer & Kahle, 1988). As such, they are connected through an "ideological network" to several different types of cognitions. Value orientations are believed to be an expression of more fundamental values – i.e., enduring beliefs about specific modes of conduct or desired end states of existence (Rokeach, 1973; Schwartz, 1992) – and they provide the basis for an individual's attitudes and norms, which in turn guide their behavior. Empirical support for this notion of a cognitive hierarchy has been found in a number of environmental and natural resource-related contexts, including

prediction of proenvironmental attitudes and behaviors (e.g., Kortenkamp & Moore, 2001; Stern & Dietz, 1994; Stern, Dietz, Kalof, & Guagnano, 1995; Stern & Oskamp, 1987), attitudes and normative beliefs regarding forest management (McFarlane & Boxall, 2000; Vaske, Donnelly, Williams, & Jonker, 2001), and wildland preservation voting intentions (Vaske & Donnelly, 1999). While support has also been demonstrated in the wildlife arena (e.g., see Fulton et al., 1996), we contend that the utility of this theoretical model could be enhanced by further exploration of certain concepts and relationships in a wildlife-related context.

The interrelatedness of constructs in the cognitive hierarchy suggests that wildlife value orientations are formed and change in conjunction with other types of beliefs. They provide consistency and organization among the broad array of wildlife-related cognitions (Fulton et al., 1996). An understanding of these orientations and their related cognitive structure therefore provides a basis for prediction of how individuals will think and behave toward wildlife. Consistent with this notion, research has shown that wildlife value orientations can be used to identify attitudes and intentions toward wildlife management proposals (Manfredo & Fulton, 1997; Manfredo et al., 1998, 1999; Whittaker, 2000) and participation in wildlife-related recreation (Bright et al., 2000; Fulton et al., 1996; Manfredo & Zinn, 1996).

To provide support for this hierarchical model, it is important not only to identify these higher-order cognitions and behaviors that stem from wildlife value orientations but also to determine what beliefs form the basis for the orientations themselves. Understanding the role that wildlife value orientations play in the cognitive hierarchy

demands an understanding of how they relate to certain fundamental values that are believed to be the ultimate source of all other beliefs and behaviors.

Are Wildlife Value Orientations Related to a Broader Value Set?

At an individual level, wildlife value orientations relate to more fundamental beliefs in the context of a cognitive hierarchy wherein they serve as an expression of basic values. These values are in turn part of a broader cultural context. It is reasonable to assume therefore that wildlife value orientations are shaped by some of the same forces affecting the representation of basic values at a societal level. We might also expect these constructs to be changing along a similar trajectory in this broader context.

Materialist theories of cultural change developed in anthropology and sociology contend that broad-scale changes in ideology (i.e., values and value orientations) result from the interplay among a number of cultural and environmental factors, including a society's economic system, technology, demography, institutions, and the environment (Buttel & Humphrey, 2002; Harris, 1999; Smith & Young, 1998). These models identify a number of forces associated with industrialization and the processes that followed (e.g., rapid growth in technology, urbanization, and occupational change) that dramatically altered life in America and in turn had a profound impact on values in this country.

Inglehart (1990, 1997; Inglehart & Baker, 2000) describes how these forces have produced the mix of values evident today. He argues that these values are an adaptation to the cultural changes that have occurred in America in the 20th century. Inglehart proposes that changes in societal values in post-industrialized nations are primarily the result of shifting need states. Economic development has elevated people from basic human material needs (e.g., safety, physical security) to higher-order psychological needs

which he terms Post-Materialist values (e.g., quality of life, self expression). He argues that changes in values, which are formed at an early age and are relatively stable *within an individual*, occur over time *in a society* as a result of intergenerational shift. Post-Materialist values are spawned by the presence of economic and physical security during one's formative years. Inglehart believes that these values began to take hold in America following World War II when the country's heightened affluence fostered a generation of individuals who now emphasize Post-Materialist concerns.

If wildlife value orientations are related to a broader ideology, we might expect that they are adapting in the same way as values to the cultural changes Inglehart describes. Research suggests that the U.S. public is moving away from a traditional utilitarian orientation toward wildlife, which is rooted in a belief that wildlife should be used and managed for human benefit, toward a more protectionist view of the resource (Manfredo & Zinn, 1996). This shift may be consistent with the broader shift away from Materialist values to which Inglehart refers. In this context, wildlife value orientations are tied to the function they serve in a society (e.g., to support hunting and other wildlife use-related activities), and as needs related to that particular function diminish, the value orientations change. Thus, as material needs (e.g., food) that fostered the development of a utilitarian value orientation toward wildlife are met, the value orientation is gradually replaced by another way of viewing the resource. This is consistent with the observation that in developing societies, where residents are still struggling to meet basic survival needs, wildlife is viewed almost exclusively in a utilitarian light as a source of food and shelter for humans (Witter, 2002). In contrast, wildlife is no longer required by

Americans for sustenance, and, consequently, a different set of orientations toward wildlife is evolving.

Satisfaction of material needs and the cultural changes affecting that transition, therefore, may be related to a shift away from both Materialist values *and* utilitarian value orientations in this country. This linkage makes sense when recognizing the consistency between beliefs related to Materialist values and those associated with a utilitarian orientation toward wildlife. Just as Materialist values place priority on economic and physical security, a utilitarian value orientation emphasizes the use of wildlife to fulfill these basic needs. Movement toward a post-modern worldview characterized by an emphasis on Post-Materialist concerns like quality of life, self-expression, and a more humane society, is in turn consistent with promoting a protectionist view of wildlife that assigns rights to animals and calls for more humane treatment of them. This leads us to our first hypothesis:

Hypothesis 1: *Wildlife value orientations are related to Materialist/Post-Materialist values. Specifically, we would expect a positive relationship between Materialist values and a utilitarian orientation toward wildlife.*

Prediction of Support for Wildlife Management Actions

We would also expect that if wildlife value orientations are related to a broader set of Materialist/Post-Materialist values that the latter would aid in predicting support for wildlife management actions in the context of an overall hierarchical model. Wildlife value orientations provide a foundation for certain types of wildlife-related attitudes and behaviors, including support for wildlife management actions. In a 1995 study, for example, Manfredo et al. (1999) found that Colorado residents' beliefs about the

acceptability of trapping were rooted in a protection versus use value orientation toward wildlife. Most protectionists indicated trapping was acceptable only in the context of preventing the spread of disease and, to a lesser extent, to protect livestock and property, whereas the majority of those with a use orientation toward wildlife found trapping acceptable under a wider range of circumstances (e.g., to prevent economic loss). Residents' beliefs about trapping were in turn related to their intentions to vote to ban trapping.

Zinn, Manfredo, Vaske, and Wittman (1998) were also able to demonstrate the predictive validity of wildlife value orientations. They found that support for wildlife management proposals – specifically, beliefs about the acceptability of management actions directed toward animals involved in human-wildlife interactions – were based on wildlife value orientations. Individuals with protectionist orientations were less willing than those with a use orientation toward wildlife to accept destroying an animal regardless of the species (i.e., mountain lion, beaver, coyote) or the situational context (i.e., incident extremity). Zinn et al. (1998) concluded their paper with a discussion of the need for further research on the role of more fundamental values in influencing the acceptability of wildlife management practices.

We contend that values can have an impact on support for management actions but that they typically do so indirectly through value orientations in the context of a cognitive hierarchy. We address this in the following hypotheses used to demonstrate the predictive validity of an overall model containing wildlife value orientations:

Hypothesis 2: *As related constructs, both Materialist/Post-Materialist values and wildlife value orientations will aid in explaining variance in support for wildlife*

management actions. We expect those with a Materialist values set to respond in a manner similar to those with a utilitarian orientation toward wildlife in evaluating the acceptability of certain wildlife management actions.

Hypothesis 3: *The relationship between Materialist/Post-Materialist values and support for wildlife management actions will be mediated by wildlife value orientations.*

METHODS

Data for this paper were obtained from the pilot phase of a long-term research program designed to assess values, wildlife value orientations, attitudes toward key wildlife management issues and actions, participation in wildlife-related recreation, and sociodemographic characteristics of western publics. The pilot phase was administered in six western states: Alaska, Arizona, Colorado, Idaho, North Dakota, and South Dakota.

Sampling Procedures

The population of interest to this study was defined as adult (i.e., at least 18 years of age) residents in each of the six participating states. The sampling frame consisted of private households with a permanent mailing address in these states. Addresses and phone numbers for a random sample of households, by state, were obtained from Survey Sampling, Inc., a commercial sampling firm.

Data Collection

Data were collected using self-report mail-back questionnaires administered from Colorado State University during March–May, 2002. A modified Dillman (2000) technique, involving introductory postcards, two complete mailings (i.e., questionnaires with cover letters), and reminder postcards, was used. To obtain approximately equal numbers of male and female respondents, half of the cover letters mailed with

questionnaires in each state requested participation by an adult male while the other half requested participation by an adult female.

A nonresponse check survey was administered by telephone to a random sample of nonrespondents in each state. The survey contained eight value orientation questions and three wildlife-related recreation questions, the responses to which were compared with those of respondents to determine if the two groups significantly differed with respect to these constructs.

Measurement

Values. Values were measured using an approach designed by Inglehart (1997) in which respondents are asked to rank a series of goal statements. Instructions prompted respondents to consider these goals as possible priorities for their country over the next ten years. Goals were arranged in three choice sets each of which contained three statements designed to represent Materialist values and three statements representing Post-Materialist values. Within each set, respondents ranked goals in order of importance with 1 = "most important" (see Manfredo et al., 2003 for a listing of goal statements).

Wildlife Value Orientations. Value orientations were measured following the approach designed by Fulton et al. (1996), in which value orientations are identified by composite scales consisting of items that represent basic beliefs. Basic beliefs were measured using 25 of the 35 items developed by Fulton et al. to represent eight basic wildlife belief domains (see Manfredo, Teel, & Bright, 2003 for a listing of these items and a description of selection criteria). Consistent with prior research, two orientations were identified, the wildlife appreciation orientation and the protection-use orientation. Because the focus here is on predicting support for wildlife management actions which is

believed to be more closely related to the protection-use orientation and due to low variance revealed in more recent applications of the appreciation measure (e.g., see Manfredo et al., 2003), we chose to exclude the appreciation orientation from our analyses.

Support for Management Actions. Support for wildlife management actions was measured using a series of items asking respondents to rate the acceptability of certain actions across several wildlife-related scenarios. The first of these was a situation involving stocking of hatchery-raised trout into waters where they may compete with the survival of native fish species. Before rating the list of actions that could potentially be used to address in this situation, respondents were asked to read the following scenario description:

> Non-native fish and wildlife species are animals that humans introduce into an area either accidentally or intentionally. In some cases, the introduced species flourishes with little or no effect on native species. However, the non-native fish or wildlife may expand to the point that they threaten the existence of native animals. An example of this is stocking of hatchery-raised rainbow trout into natural streams and lakes where native trout species exist. This may enhance recreational fishing. However, the hatchery-raised fish may interfere with the survival of native trout.

Respondents were then asked to rate their level of agreement (1 = "Strongly Disagree", 7 = "Strongly Agree") with the following statement: "Hatchery-raised trout should NOT be introduced into waters where they would interfere with the survival of native trout." They then evaluated the acceptability of two actions – continuing to introduce the hatchery-raised trout in order to enhance fishing opportunities versus stopping the stocking of hatchery-raised trout, and taking whatever measures necessary to remove them from waters shared with native trout – on a scale ranging from 1 = "highly unacceptable" to 7 = "highly acceptable".

Another situation focused on the abundance of coyote populations (see scenario description below), for which respondents were asked to evaluate the acceptability of a number of actions (1-7 unacceptable/acceptable scale), including the following lethal control measures: allowing hunters to hunt coyotes without limitations on the number of animals that can be killed (i.e., no bag limits), aerial gunning of coyotes, poisoned baiting of coyotes, and taking whatever steps are necessary to eliminate coyotes from areas where they are not native.

> In many areas of the West, coyote populations have become quite abundant, including areas where they are not native (naturally occurring). Some people are concerned that deer, endangered species, and other wildlife populations are declining and that attacks on sheep and cattle are becoming more frequent as a result of more coyotes. These people believe that coyote numbers should be managed, while others feel that coyote populations should be left alone. A variety of mechanisms are available to manage predator populations. These include fertility control, aerial gunning, poisoning, and hunting.

A final scenario involved funding for the development of wildlife viewing programs:

> Many people have expressed interest in having more opportunities to view wildlife. However, developing these opportunities by fish and wildlife agencies to meet this demand requires money. One potential source of these funds is from the sale of hunting and fishing licenses and equipment, funds that have traditionally been allocated to managing fish and wildlife that are fished and hunted. Other possible sources of "wildlife viewing" funding include voluntary contributions by the public or reallocation of existing state revenue. Also, there are people who feel that no additional funds should be spent by fish and wildlife agencies for wildlife viewing.

After reading the situation description, respondents rated their level of agreement on the 1-7 agree/disagree scale with the following, "Fish and wildlife agencies should NOT take money away from managing hunting and fishing opportunities in order to develop wildlife viewing opportunities". Possible funding mechanisms, which respondents were asked to evaluate (1-7 unacceptable/acceptable scale), included "use

funds from the sale of hunting and fishing licenses and equipment", "request new taxes", "require land and water developers to pay taxes", and "redirect some of the revenue already collected by the state (for example, existing sales tax or lottery revenue)".

Data Analysis

Scale Construction and Reliability Analysis. A values index was developed by first summing the importance rankings on the Post-Materialist goal statements across all choice sets. The same procedure was used to sum scores on all Materialist goal statements. The sum of Post-Materialist rankings was then subtracted from the sum of Materialist rankings. In the resulting index (alpha = .69), a negative score indicated a "Materialist" values set, a positive score indicated a "Post-Materialist" values set, and 0 was treated as "Mixed".

The internal consistency of the protection-use wildlife value orientation and its corresponding basic belief domains was assessed using Cronbach's alpha. Internal consistency was also assessed in this manner for the items representing support for wildlife management actions across each of the scenarios described above. Confirmatory factor analysis was conducted using Amos version 5.0.1 (Arbuckle, 2003) to further investigate the internal consistency of the value orientation and support for management action scales.

Tests of Hypotheses. The hypothesized relationship between Materialist/Post-Materialist values and the protection-use wildlife value orientation was tested using Pearson's correlation coefficient (r). For the purposes of this analysis, a scale was created to represent scoring on the protection-use orientation. Scores were assigned in a two-stage process. First, individual scores were assigned for each basic belief domain by

taking the mean of responses to items within that domain. In the second stage, scores were assigned for the overall orientation by computing the mean of belief domain scale scores.

Structural equation modeling, with the assistance of Amos, was used to test three different models (corresponding to the three wildlife management scenarios) predicting support for wildlife management actions from values and value orientations and to test for mediation by wildlife value orientations. Consistent with requirements outlined in the structural equation literature on testing for mediation (e.g., see Hayduk, 1987; Holmbeck, 1997), we tested the fit of a series of models to the data for each scenario. First, in a *full mediation model*, the predictor (values) influences the criterion (support for management actions) indirectly through its effect on the mediator (value orientations). Second, in a *partial mediation model*, the predictor influences the criterion directly and indirectly through its effect on the mediator. Finally, in a *direct effects model*, the predictor directly affects both the criterion and the mediator, but the mediator is constrained to not affect the criterion.

Mediation is demonstrated under the following conditions: (a) the predictor is significantly related to the mediator and to the criterion variable in the direct effects model; (b) paths between the predictor and the mediator and between the mediator and criterion are significant in both the full and partial mediation models – full mediation occurs when paths from the predictor to the criterion are not significant in the partial mediation model; and (c) a comparison of the three models using the change in chi-square statistics indicates which model is a better fit to the data (i.e., the model with the

significantly smaller chi-square value is the better fitting model; Hayduk, 1987; Holmbeck, 1997).

RESULTS

We obtained an overall response rate of 35% (n = 3216) for the mail-back questionnaire. Rates ranged from 32% to 38% across participating states. The nonresponse check survey (n = 2204, 75% response rate) revealed that, while respondents and nonrespondents did not significantly differ on wildlife value orientations, statistically significant differences existed between the two groups with respect to participation in wildlife-related recreation. Findings also revealed that our sample was underrepresented by younger age categories and females. Data were weighted by state to account for these differences using nonresponse check information and state population estimates of age and sex obtained from the U.S. Census 2000 (U.S. Department of Commerce, 2002).

Reliability and Confirmatory Factor Analyses

Alpha values ranged from .56 to .86 across the four domains comprising the protection-use wildlife value orientation, indicating generally acceptable reliability of item clusters (Nunnally & Bernstein, 1994). Cronbach's alpha for the overall orientation was .88. Items measuring support for wildlife management actions across each of the scenarios were also found to be highly internally consistent (alpha = .76 to .79). The confirmatory factor analysis provided further evidence of the reliability of these constructs (Table 1). Standardized factor loadings ranged from .52 to .87 for protection-use belief dimensions, and from .54 to .78 for items comprising the support for management action scales (all t values were significant at $p < .001$).

Tests of Hypotheses

Consistent with our first hypothesis, bivariate analysis revealed a significant relationship between values and wildlife value orientations ($r = -.28, p < .001$). Specifically, individuals with a Materialist value set were more likely than Post-Materialists to have a use orientation toward wildlife.

To test the predictive validity of a model containing values and wildlife value orientations in explaining support for wildlife management actions, three structural equation models – direct effects, full mediation, and partial mediation models – were examined for each management scenario. First, in the direct effects models, values were significantly related to support for wildlife management actions ($|\beta| \geq .24, t \geq 11.46, p < .001$) and to wildlife value orientations ($|\beta| = .28, t \geq 9.63, p < .001$) across all three scenarios. This established the first condition for mediation in each case. In the full mediation models, values influenced wildlife value orientations ($|\beta| \geq .28, t \geq 13.66, p < .001$) which in turn influenced support for wildlife management actions ($|\beta| \geq .43, t \geq 13.76, p < .001$). The same relationships (i.e., between predictor and mediator and between mediator and criterion) were apparent in the partial mediation models ($|\beta| \geq .28, t \geq 12.43, p < .001$) across all scenarios.

In addition to conditions outlined above, support for the partial mediation model was evident in an examination of the change in chi-square statistics across the three model types (direct effects, partial mediation, full mediation) for each scenario (Table 2). In each case, the partial mediation model had a significantly better fit to the data than

either the direct effects model or the full mediation model. Thus, the partial mediation model was chosen to describe the hypothesized relationships for each scenario.[1]

An examination of individual components of the partial mediation model for each scenario reveals support for our hypotheses regarding the direction and significance of relationships among values, wildlife value orientations, and support for wildlife management actions (Figures 1-3). Twenty-one percent of the variance in support for stocking of hatchery-raised fish was explained by values and wildlife value orientations (R^2 = .21). Those with a Materialist values set were more likely than Post-Materialists to support fish stocking. Furthermore, individuals with a utilitarian wildlife value orientation were more likely than those with a protectionist orientation toward the resource to support stocking. Nineteen percent of the variance in support for lethal control of coyotes was explained by the combined effect of the two predictor variables included in the model. The following groups of individuals were more likely to support (or, more accurately, less likely to oppose) lethal management: those with Materialist values and those with a use orientation toward wildlife. In contrast, Materialists and those with a utilitarian wildlife value orientation were less likely than their counterparts to express support for funding for the development of wildlife viewing programs (R^2 = .22). As noted by the magnitude of standardized regression weights, and as we would

[1]Overall model fit can be judged using a number of indicators (CFI, NFI, χ^2, χ^2/df, etc.). However, many of these "goodness of fit" indices are affected by sample size (Bollen, 1990). For example, a non-significant chi-square statistic suggests good fit, but large sample sizes (>500; n = 3216 in our study) inflate chi-square values, creating significance even when the model fits well (Jöreskog & Sörbom, 1993). In addition, while generally accepted guidelines are reported in the literature (e.g., CFI $\geq$ .90; Church & Burke, 1994), there is still some disagreement over what constitutes a "good fit". Some suggest that the selection of a rigid cutoff value for fit indices is somewhat arbitrary and may not be the best way to interpret model fit (Bollen, 1989). Others have gone further to suggest that there is an over-reliance on these indices in interpreting how well models fit the data (Chin, 1998). Instead, they argue model fit should be assessed through an examination of individual model components (i.e., significance and direction of hypothesized paths, and amount of variance explained in dependent measures) and comparison with alternative models in a theoretical context.

expect in the context of a cognitive hierarchy, the protection-use wildlife value orientation made a greater contribution compared to Materialist/Post-Materialist values in explaining variance in support for wildlife management actions across all scenarios.

DISCUSSION

The concept of value orientations has proven useful in a number of wildlife and natural resource-related applications. Since the development of a theory of wildlife value orientations by Fulton et al. (1996), this approach has been tested and used in numerous studies in an attempt to capture the broad array of specific values people hold toward wildlife (e.g., DeRuiter & Donnelly, 2002; Manfredo et al., 1998; 1999; Manfredo & Fulton, 1997; Manfredo & Zinn, 1996; Zinn et al., 2002). While this body of research has demonstrated the utility of wildlife value orientations in being able to predict certain wildlife-related attitudes and behaviors (e.g., see Manfredo & Zinn, 1996; Whittaker, 2000), little attention has been devoted to understanding the basis for these orientations.

Wildlife value orientations are defined by the pattern and direction of basic beliefs that individuals hold toward wildlife. They are believed to be woven into a hierarchical belief structure consisting of several different types of inter-related cognitions (Fulton et al., 1996; Homer & Kahle, 1988). In this context, wildlife value orientations are thought to be an expression of an individual's more fundamental values and to in turn affect higher-order cognitions, including attitudes, norms, and ultimately behaviors. To provide support for this hierarchical model, it is important not only to identify the cognitions and behaviors that stem from wildlife value orientations (which has been the focus of much of the research on wildlife value orientations) but also to determine what beliefs form the basis for the orientations themselves.

Using data from a survey of residents in six western states (Alaska, Arizona, Colorado, Idaho, North Dakota, and South Dakota), we examined the relationship between wildlife value orientations and more fundamental values. Specifically, we explored the link between a utilitarian versus protection orientation toward wildlife and Materialist/Post-Materialist values. The latter construct is central to a theory on value shift developed and tested cross-culturally by Inglehart (1997), who maintains that economic development tied to industrialization and the processes that followed have elevated people in the U.S. from basic human material needs (e.g., safety, physical security) to higher-order psychological needs which he terms Post-Materialist values (e.g., quality of life, self expression). This shift may be consistent with the shift away from a traditional utilitarian orientation toward wildlife that we are witnessing in this country in that satisfaction of material needs (e.g., food) that fostered the development of a utilitarian value orientation toward wildlife has led to a change in the way we view the resource.

Results revealed a significant relationship between values and wildlife value orientations. As we hypothesized, individuals with a Materialist value set were more likely than Post-Materialists to have a utilitarian orientation toward wildlife. We expanded our investigation of the relationship between values and wildlife value orientations to also test the predictive validity of an overall model containing both constructs in explaining variation in support for wildlife management actions. We hypothesized that if wildlife value orientations were related to more basic values that the latter would aid in predicting support for management actions and that, consistent with the notion of a cognitive hierarchy, value orientations would mediate this relationship.

Our model was tested across three different wildlife management-related "scenarios" that were described to survey respondents prior to their evaluation of different management actions corresponding to each scenario. The first scenario was represented in a situation involving stocking of hatchery-raised trout in areas where they may interfere with the survival of native fish species. Respondents were asked to evaluate the acceptability of continuing to stock hatchery-raised trout versus stopping this practice and removing the released fish from areas where they may adversely affect native species. After reading about a scenario on coyote management, respondents were asked to rate the acceptability of a number of lethal coyote control options. The final scenario focused on an evaluation of various funding mechanisms (e.g., new taxes) that could be used to develop agency programs for wildlife viewing.

Results across all three scenarios provided consistent support for our overall model. In each case, values and wildlife value orientations were significantly related to support for wildlife management actions. Those with a Materialist values set were more likely than Post-Materialists to support fish stocking and lethal control of coyotes and less likely than their counterparts to support a variety of funding mechanisms for wildlife viewing program development. Furthermore, individuals with a utilitarian wildlife value orientation responded in a manner similar to those with a Materialist values set – i.e., they were more in favor of fish stocking and lethal coyote control and less supportive of wildlife viewing funding – while responses of individuals with a protectionist orientation toward wildlife were generally consistent with those of Post-Materialists. As we would expect in the context of a cognitive hierarchy, wildlife value orientations made a greater contribution compared to Materialist/Post-Materialist values to explaining variance in

support for wildlife management actions across all scenarios. In addition, wildlife value orientations were found to partially mediate the relationship between values and support for management actions.

Study Implications and Future Research Needs

Our findings are consistent with other studies that have highlighted the role that wildlife value orientations can play in influencing attitudes and intentions toward wildlife management proposals (e.g., Manfredo et al., 1999; Zinn et al., 1998). The combined evidence points to lower levels of support for certain traditional agency programs and activities (e.g., stocking of hatchery-raised trout to enhance fishing opportunities, and lethal wildlife control measures) among those with a protectionist value orientation toward wildlife. These individuals are also interested in provision of certain types of opportunities (e.g., wildlife viewing) that have not typically been the focus of agency efforts. This has important implications for the future of wildlife management given other research which suggests that the U.S. public is moving away from an emphasis on traditional use orientations toward a more protectionist view of the resource (Manfredo et al., 2003; Manfredo & Zinn, 1996).

The inclusion of a measure designed to represent more basic values in our model enhances our understanding of the psychological basis for specific evaluations of management actions. It provides greater consistency and predictability with respect to understanding diverse patterns of wildlife-related attitudes and behaviors. Across several types of wildlife management actions, we were able to provide evidence of the inter-related nature of different types of cognitions – cognitions shown to be rooted at the most basic level in individual values. Also, as indicated by the significant relationship

between values and wildlife value orientations, our inclusion of a values measure was helpful in explaining differences in value orientations toward wildlife. Utilitarian orientations toward wildlife were more prevalent among those with Materialist values. These findings, combined with Inglehart's (1997; Inglehart & Baker, 2000) research, which suggests post-industrialized societies like the United States are moving away from an emphasis on Materialist values, indicates the need for an understanding of both concepts in planning for the future of wildlife management. By knowing the distribution of certain value and value orientation types and how their representation in society is changing, we have a basis for anticipating how the public and certain segments of the public will respond to future management issues.

The body of research that has emerged demonstrating the predictive validity of wildlife value orientations suggests that these orientations are particularly useful in understanding the basis for *certain kinds* of wildlife management proposals. As an example, Zinn et al. (1998) revealed their utility in explaining the basis for the acceptability of actions directed toward animals involved in human-wildlife interactions. We were able to demonstrate a relationship between value orientations and a more diverse set of management actions. However, further research is needed to determine the array of factors that relate to evaluations of management practices. As an example, what actions and characteristics of those actions are more likely to be linked to a use versus protection orientation toward wildlife? This question becomes increasingly important in the context of value and wildlife value orientation shift in this country.

Related to this is a need to recognize that certain variables mediate the relationship between wildlife value orientations and support for wildlife management

actions. These variables might include, for example, beliefs about the outcomes of specific management actions. Therefore, while it is possible to anticipate how people might respond to certain wildlife management proposals on the basis of their orientations toward the resource, value orientations are more useful in specifying a *general pattern* of wildlife-related cognitions as opposed to predicting a single reaction at a particular point in time. In our combined model containing both values and wildlife value orientations, we were only able to explain between 19 and 22% (see R^2, Figures 1-3) of the variance in support for wildlife management actions. This suggests that other variables are needed to fully understand variation in acceptability of these practices. Ajzen and Fishbein (1980) contend that the strength of relationships between two psychological measures is in part determined by the correspondence in level specificity between them. As an illustration, greater prediction of support for lethal control of coyotes might come from inclusion of a measure of beliefs about the outcomes related to lethal control of coyotes or of a measure of general attitudes toward predator control – both of which are more specific than wildlife value orientations.

Our investigation also highlights certain directions for future research that could enhance our understanding of the basis for wildlife value orientations and thereby assist with management-related applications. One question that deserves attention is: what other variables influence wildlife value orientations? We reported a moderate effect size (denoted by the correlation coefficient *r*; Cohen, 1988) for the relationship between Materialist/Post-Materialist values and wildlife value orientations. Are there other types of values that are more strongly related to wildlife value orientations?

Our findings with respect to the relationship between Materialist/Post-Materialist values and wildlife value orientations also points to a need to understand what factors have shaped the evolution of wildlife value orientations in this country and how those factors are related to the current mix of certain types of values in contemporary society. While it makes sense, for example, to assume that wildlife value orientations have adapted to some of the same cultural conditions that Inglehart (1997) argues are related to the shift toward Post-Materialist values in the U.S. – i.e., an elevation from basic human material needs driven by economic forces associated with modernization – a more thorough exploration of this hypothesis is necessary. It will entail an historical study of the evolution of the wildlife/animal protectionist movement, including an identification of its driving forces.

A final question that we raise is whether our approach to understanding and measuring wildlife value orientations can be applied cross-culturally. If wildlife value orientations are related to a broader ideology that is shaped by certain cultural and environmental factors, how do these orientations differ across different societies? Manfredo and Dayer (2004, in press) highlight several priorities for cross-cultural investigation, including a determination of the applicability of the protection-use orientation outside of North America and an identification of alternative ways for viewing the resource in different societies. There is also a need for investigating the utility of various methodological approaches to measuring wildlife value orientations cross-culturally. Addressing these research priorities will aid in our attempts to understand the forces that affect wildlife value orientations at a societal level – forces that ultimately affect how wildlife is managed both nationally and internationally.

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Table 1. Confirmatory factor[1] and reliability analyses for latent constructs.

	Standardized factor loading	SE	*t* Value[2]	Cronbach's alpha
Protection-use orientation[3]				.88
Wildlife use dimension	.52	.021	29.30	.56
Wildlife rights dimension	.72	.026	44.17	.76
Hunting dimension	.86	.023	55.37	.86
Fishing dimension	.75	.017	46.62	.66
Support for wildlife management actions[4]				
Stocking of hatchery-raised trout				.79
Hatchery-raised trout should NOT be introduced into waters where they would interfere with the survival of native trout.[5]	.64	.043	27.61	
Continue to introduce the hatchery-raised trout in order to enhance fishing opportunities.	.78	.043	34.66	
Stop stocking hatchery-raised trout, and take whatever measures necessary to remove them from waters shared with native trout.[5]	.78	.040	34.81	
Management of coyotes				.76
Allow hunters to hunt coyotes without limitations on the number of animals that can be killed.	.61	.040	34.43	
Use trained professionals to shoot coyotes from helicopters to control the size of coyote populations.	.73	.036	42.28	
Use trained professionals to set poisoned bait to control the size of coyote populations.	.76	.034	44.81	
Take whatever steps are necessary to eliminate coyotes from areas where they are NOT native (naturally occurring).	.62	.036	34.58	

Table 1. Continued

	Standardized factor loading	SE	*t* Value[2]	Cronbach's alpha
Funding for wildlife viewing				.77
Fish and wildlife agencies should NOT take money away from managing hunting and fishing opportunities in order to develop wildlife viewing opportunities.[5]	.60	.036	32.57	
Use funds from the sale of hunting and fishing licenses and equipment to develop wildlife viewing opportunities.	.70	.036	39.24	
Request new taxes specifically to pay for the development of wildlife viewing opportunities.	.54	.036	29.06	
Require land and water developers to pay taxes geared toward the development of wildlife viewing opportunities.	.64	.038	34.95	
Redirect some of the revenue already collected by the state (for example, existing sales tax or lottery revenue) to use specifically for the development of wildlife viewing opportunities.	.59	.036	31.82	

[1] Consistent with requirements of Amos (Arbuckle, 2003), unweighted data were used in confirmatory factor analysis.
[2]All reported *t* values are significant at $p < .001$.
[3]See Manfredo et al. (2003) for a list of basic belief items comprising each dimension of the protection-use orientation. Items were measured on a scale from 1=strongly disagree to 7=strongly agree. Scales representing each dimension were created by taking the mean of responses to individual items within the dimension. Coding was reversed on the wildlife rights dimension before analysis was conducted.
[4]All items, with the exception of the first item listed in the table under the following scenarios (which was measured on a 1-7 disagree/agree scale), were measured on a scale from 1=highly unacceptable to 7=highly unacceptable: stocking of hatchery-raised trout and funding for wildlife viewing.
[5]Item was reverse coded prior to analysis.

Table 2. Comparison of overall model fit in tests of mediation across three wildlife management scenarios.

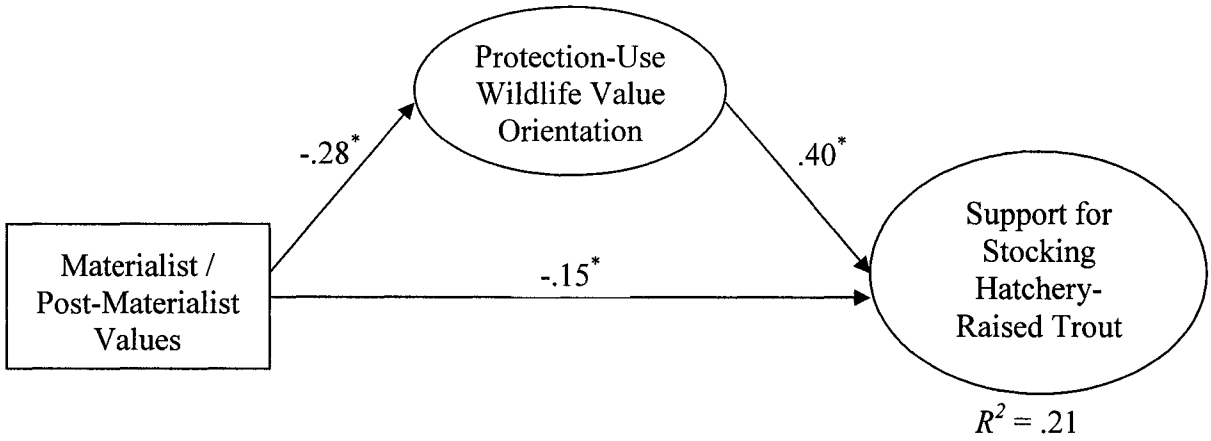
Model Type	χ^2	χ^2 / df	NFI	CFI
Stocking of hatchery-raised trout[1]				
Direct effects model	317.36	16.70	.95	.95
Full Mediation model	149.11	7.85	.98	.98
Partial Mediation Model	**116.00**	**6.44**	**.98**	**.99**
Management of coyotes[2]				
Direct effects model	865.01	33.27	.90	.90
Full Mediation model	598.72	23.03	.93	.93
Partial Mediation Model	**555.86**	**22.23**	**.94**	**.94**
Funding for wildlife viewing[3]				
Direct effects model	1555.17	45.74	.84	.84
Full Mediation model	1339.75	39.40	.86	.86
Partial Mediation Model	**1268.95**	**38.45**	**.87**	**.87**

[1] $\Delta\chi^2_{(\text{full-partial})} = 33.11, p < .001$; $\Delta\chi^2_{(\text{direct-full})} = 168.25, p < .001$; $\Delta\chi^2_{(\text{direct-partial})} = 201.36, p < .001$.

[2] $\Delta\chi^2_{(\text{full-partial})} = 42.86, p < .001$; $\Delta\chi^2_{(\text{direct-full})} = 266.29, p < .001$; $\Delta\chi^2_{(\text{direct-partial})} = 309.15, p < .001$.

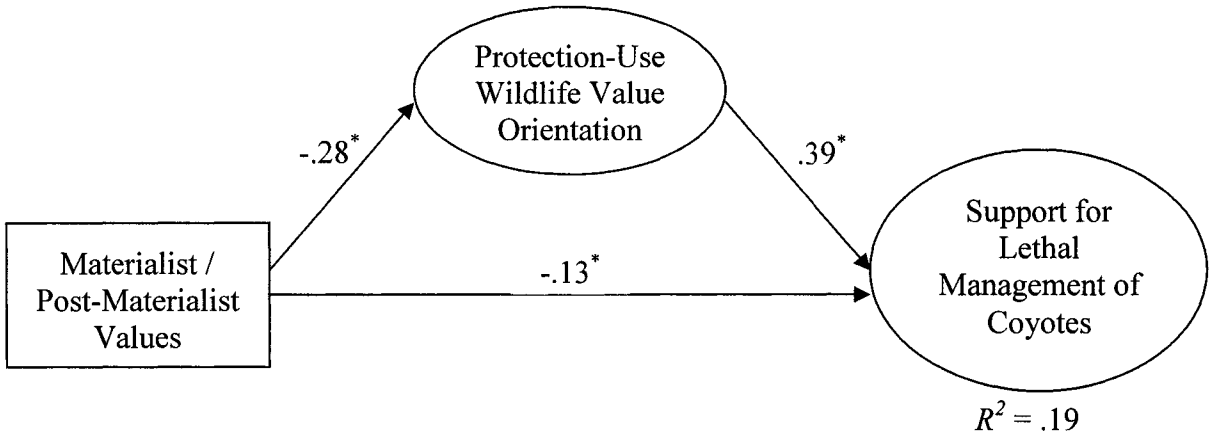
[3] $\Delta\chi^2_{(\text{full-partial})} = 70.80, p < .001$; $\Delta\chi^2_{(\text{direct-full})} = 215.42, p < .001$; $\Delta\chi^2_{(\text{direct-partial})} = 286.22, p < .001$.

Figure 1. Structural equation model predicting support for stocking hatchery-raised trout.[1]



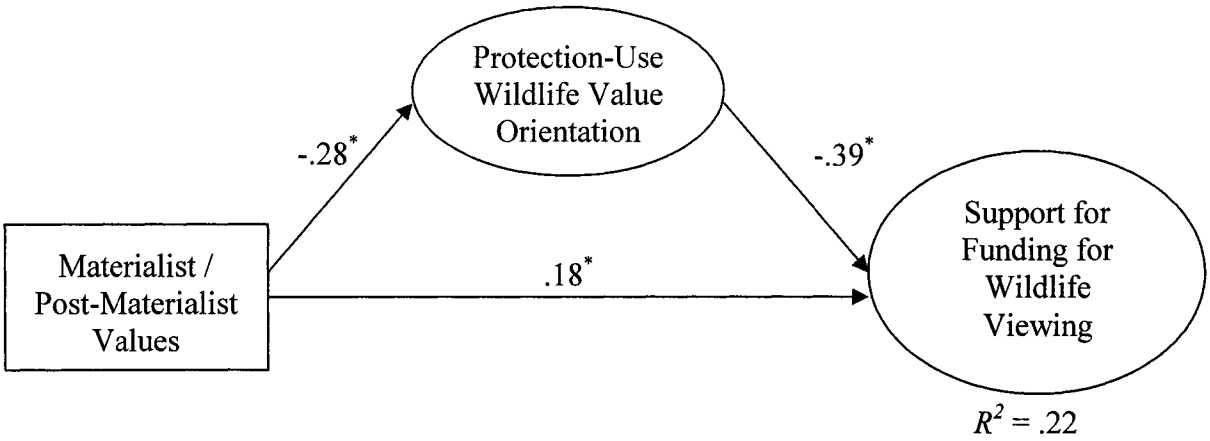
[1]Consistent with requirements of Amos (Arbuckle, 2003), unweighted data were used in structural equation analyses.
*All path coefficients (standardized regression weights) were significant at $p < .001$.

Figure 2. Structural equation model predicting support for lethal management of coyotes.[1]



[1]Consistent with requirements of Amos (Arbuckle, 2003), unweighted data were used in structural equation analyses.
*All path coefficients (standardized regression weights) were significant at $p < .001$.

Figure 3. Structural equation model predicting support for funding for wildlife viewing.[1]



[1]Consistent with requirements of Amos (Arbuckle, 2003), unweighted data were used in structural equation analyses.
*All path coefficients (standardized regression weights) were significant at $p < .001$.

III. SOCIETAL TRENDS AND EFFECTS ON HUNTING IN THE U.S.

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ABSTRACT

We explain how an understanding of cultural change, including value and wildlife value orientation shift, lends itself to a greater awareness of what may be driving declines in hunting participation in the United States. In recent decades, there has been a gradual movement away from emphasis on a traditional utilitarian orientation toward wildlife toward a more protectionist view of the resource. According to Materialist theories of cultural change, this shift is driven by the interplay among a number of cultural and environmental factors. In this context, values are adaptive – they are tied to the function they serve in a society, and, as the needs related to that particular function diminish, values change. Therefore, utilitarian orientations toward wildlife may be changing as the societal needs related to them, including food and physical security, have diminished. Tied to this is a change in behavior, like hunting, that a utilitarian orientation has come to support. Using data from a survey of residents in six western states, we examine the relationship between hunting and certain societal-level factors – urbanization, income, education, and residential stability – believed to be indicative of forces associated with modernization and to in turn be related to value shift in the United States.

Key words: cultural materialism, hunting, values, value shift, wildlife value orientations

INTRODUCTION

Hunting participation in the United States has been on a downward trend in recent decades. From 1983 to 1995, for example, national representation fell from 12% to 9% of the U.S. population. In actual numbers this meant a loss of 2 million people (Cordell & Overdevest, 2001). The decline was sustained from 1996 to 2001, when numbers reportedly fell nationwide from roughly 14 million to 13 million people (a 7% decrease; U.S. Department of the Interior, Fish and Wildlife Service, 1997, 2002). Declines in license sales are also apparent in many states (Mangun, Hall, & O'Leary, 1996; Miller & Vaske, 2003). Projections suggest that participation will continue to decline in the future, with an estimated decrease of at least 11% at the national level by the year 2050 (Bowker, English, & Cordell, 1999; Warwick, 2000).

This decline has significant implications for state fish and wildlife agencies that continue to rely heavily upon revenue from hunting and fishing license sales for funding wildlife management (U.S. Department of the Interior, Fish and Wildlife Service, 1999). Additionally, state agencies rely on hunting as a means of controlling game populations and are concerned that a decrease in participation will interfere with the agencies' ability to manage these species (Backman & Wright, 1993; Mehmood, Zhang, & Armstrong, 2003).

Research attempting to explain declines in hunting typically emphasizes specific individual-level characteristics and constraints to hunting. As an example, studies suggest that time constraints and a lack of financial resources can contribute to an individual's decision not to participate (Barro & Manfredo, 1996; McFarlane, Boxall, & Adamowicz, 1999; Walsh et al., 1992). These studies also emphasize the relationship

between certain sociodemographic characteristics and hunting participation (e.g., Cordell et al., 1999; Mehmood et al., 2003). Other research at the individual level has shown that involvement in hunting is related to a utilitarian value orientation toward wildlife (Fulton, Manfredo, & Lipscomb, 1996). These studies, as a whole, contribute to an understanding of the factors that affect an individual's decision to hunt and therefore the reasons for why individuals might drop out of the sport or choose not to become involved in the first place.

Using data from a survey of residents in six western states, we examine the relationship between hunting and certain individual-level factors to demonstrate the typical approach applied by many of these studies. We then explore another approach to understanding hunting which seeks broader, macro-level explanations for declines observed at the national level. It involves the identification of factors related to hunting at a societal level and an examination of how those factors are changing over time. We illustrate this broader approach by revealing how an understanding of value shift and the cultural factors affecting that shift lends itself to a greater awareness of what may be driving declines in hunting in the United States.

Driving Forces of Societal Change in the United States in the 20th Century

We adopt the view that declines in hunting are part of a broader societal shift that is occurring in the United States. An understanding of recent trends can be found in an examination of macro-level phenomena related to cultural change in this country.

Materialist theories of cultural change developed in anthropology and sociology contend that broad-scale cultural changes result from the interplay among a number of cultural and environmental factors, including a society's economic system, technology,

demography, institutions, and the environment (Buttel & Humphrey, 2002; Harris, 1999; Smith & Young, 1998). These models focus on several major events, or forces, tied to industrialization that have dramatically altered our society and had a profound impact on life in this country. Attention is given to each of these below.

Rapid Growth in Technology. Prior to industrialization, the American economy was largely dependent upon extraction of natural resources (e.g., agriculture, mining, fishing, timber, etc.). Industrialization altered this scenario by creating an economy centered on manufacturing of goods through technology (Bell, 1973). Technological change associated with industrialization and the processes that followed propelled our nation into a period of modernization characterized by changes in modes of production and tremendous economic growth and productivity. It was linked to a number of other societal events, including urbanization, occupational change, and value shift, each of which is described below.

Urbanization. With industrialization, people were drawn to cities where they were increasingly employed by the manufacturing and later by the service sectors. This movement had a profound impact on day-to-day experiences and world views. It led to a loss of touch with the traditional institutions of social authority (e.g., the church, local community, and extended family; Halttunen, 1982; Sellers, 1991). Further, urbanization created an environment in which people interacted with other people or with technology, which Bell (1973) refers to as "a game against fabricated nature", rather than directly with natural resources that would be more typical of rural residence.

Broad-Scale Occupational Change. Changes in technology ultimately launched the United States into a "post-industrial" phase characterized by the growth of the service

sector – a division of the economy largely based upon exchange and processing of information (Bell, 1973). This led to the creation of a new service class and transformed the nature of the American workforce. Following World War II, the traditional industrial working class declined in representation to the point that it forced the social democratic parties in power to appeal to new sources in their attempt to maintain the industrial workforce (Buttel, 1992). However, at the risk of alienating the working class electorate, social democratic parties were hesitant to embrace the concerns and interests of "the new class" (individuals employed outside of the corporate setting, e.g., service sector employees; see Buttel, 1992). The American political environment was transformed by political mobilization among members of the new class and associated pressures on political decisions that resulted from the inability of the social democratic parties to respond to the needs of this rising group.

Value Shift. Inglehart (1990, 1997; Inglehart & Baker, 2000) describes how changes associated with modernization have played a primary role in producing the mix of values evident in contemporary society. These values are an adaptation to the cultural changes that have occurred in America in the 20th century. Inglehart proposes that changes in societal values in post-industrialized nations are primarily the result of shifting need states. Economic development has elevated people from basic human material needs (e.g., safety, physical security) to higher-order psychological needs which he terms Post-Materialist values (e.g., quality of life, self expression). He argues that changes in values, which are formed at an early age and are relatively stable *within an individual*, occur over time *in a society* as a result of intergenerational shift. Post-Materialist values are spawned by the presence of economic and physical security during one's formative years.

Inglehart believes that these values began to take hold in America following World War II when the country's heightened affluence fostered a generation of individuals who now emphasize Post-Materialist concerns. Inglehart's theory of Materialist/Post-Materialist value shift is supported by empirical data collected in 65 societies around the world and across several decades (Inglehart & Baker, 2000).

Hunting in the Broader Context of Societal Changes

Population-level changes in hunting participation can be examined in the context of these broader societal changes that have taken place in the United States. Specifically, societal changes are linked to two important phenomena that may be related to changing patterns of participation observed at the national level: (1) a change in the functions that hunting serves for American society, and (2) a shift in wildlife value orientations upon which hunting is based.

Changing Functions of Hunting. Hunting has evolved over time from an activity upon which people in this country depended for survival to a recreational pursuit that serves the changing needs of contemporary society. While its purpose has diminished in the context of contributing directly to societal functioning, the cultural traditions that developed to support hunting are changing more slowly and therefore remain strong even today.

Hunting began as a subsistence activity, providing food for early settlers to North America (Herman, 2001; 2003). It was thus rooted in a very material need that led to its integration into society as a practice responsible in part for this country's economic well-being. Political and legal institutions (e.g., regulations) were established to promote and define its existence. Its primary role as a mode of production in the establishment and

growth of early American society also led to the development of certain rituals and myths to support and reinforce the cultural survival of hunting. As an example, communal ceremonies accompanied by food and festivities came to mark the beginning of the hunt, giving hunters the strength and courage they needed to be successful (Dizard, 2003). Fathers introduced their sons to hunting at a young age – a ritual signifying their initiation into manhood and that was believed to form character and teach them certain virtues like humility. It also signified a tool for teaching children about the natural world and how it worked.

According to anthropologists and other scholars who study myth (e.g., see Brody, 2000; Campbell, 1988; Nelson, 1990), myths and legends about hunting developed and served to bound the activity and frame it in a certain cultural context. In America, hunting became part of a national "narrative" of progress and growth that portrayed hunters as fearless heroes and advancers of civilization along the American frontier (Dizard, 2003). Skilled hunters became well-respected members of their community and were assigned immortal status through legends of "the hunt" that were passed down to younger generations (Campbell, 1988).

Over time, Americans became less dependent on hunting for their nutritional and other material needs. This transition began with the growth of agrarian society and became particularly evident during the modernization phase in which modes of production shifted from reliance on extraction of natural resources to the industrial manufacturing of goods and services (Bell, 1973; Smith & Young, 1998). With technological advancement associated with industrialization came the development of

mass agriculture that supplied this nation's food source. Hunting was therefore becoming a form of subsistence for a smaller and smaller segment of society (Dizard, 2003).

Even though the original function of hunting has virtually disappeared, its cultural significance remains. One of the reasons for this is the establishment and persistence of political, legal, and social institutions that integrated hunting into virtually every aspect of American society. For example, state wildlife agencies which were founded largely on principles of game management (e.g., see Leopold, 1933) are still rooted both financially and otherwise in the practice of hunting – e.g., sale of hunting licenses, management for desired game species, enforcement of hunting-related regulations. Season structures, bag limits, and property restrictions / boundaries are in place to regulate the taking and protection of hunted species. Legislation, including the Pittman-Robertson Act of 1937 and the Federal Migratory Bird Hunting Stamp Act of 1934, has established precedents for the provision of financial support for hunting programs (Whisker, 1999). Commercial entities, including meat-processing plants, hunting supply companies (e.g., Cabella's), and hunting guide services, ensure that hunting is still a significant part of the economic structure of certain communities. Social institutions, such as private hunting clubs and organizations (e.g., Ducks Unlimited, Boone and Crockett Club), and institutional practices, including church services and school holidays set aside for hunting (e.g., see Fitchen, 1991), have provided an important foundation and source of monetary support for hunting and hunting-related programs.

Cultural traditions expressed in prevailing myths and rituals that developed to support hunting when it was necessary for survival are still evident and remain strong enough to sustain its modern-day existence. These traditions, rooted in societal values

and norms, are slow to change and continue to be passed down through generations of Americans. As an illustration, narratives promoting the integrity and virtues of hunting are revealed in sport magazines (e.g., *Field and Stream*) and other popular media that, in a sense, celebrate a romanticized version of the American hunting tradition (Dizard, 2003). These narratives convey the "ideal of the American sport hunter", defining what it means to be a good, ethical hunter – a person who understands and makes efforts to become knowledgeable of wildlife and nature, who practices self-restraint, and who is respectful of animals and of the safety and well-being of others (Dizard, 2003).

The survival of institutions and traditions tied to hunting is particularly evident in rural communities in the United States, where the cultural importance of the sport has remained the strongest (Heberlein & Thomson, 1996; Lamar & Donnell, 1987). In the words of anthropologist Janet Fitchen (1991, p.251), hunting can be viewed as "a local cultural activity rooted in rural space". It serves to "weave people into the fabric of social life in traditional rural communities" (Decker, Brown, & Siemer, 2001, p. 290).

Several factors are believed to play a role in maintaining the strength of hunting in rural America. First, the activity is more closely tied to its original function as a food source and economic mainstay in rural communities, where dependence on natural resources is a not-too-distant reality (Dizard, 2003). In addition, changes in values and traditions that provide support for activities like hunting are believed to occur more gradually in rural as opposed to urban communities (Eriksen, 2001).

Hunting has stronger institutional and social reinforcement in rural communities. Evidence of this is exemplified in the continued tradition of public events associated with the opening of big game hunting seasons in many rural areas, particularly in the northeast

(Fitchen, 1991). Local merchants and churches entice and cater to hunters (e.g., hosting "send-off breakfasts" and hanging "welcome hunters" signs, etc.), and both hunters and nonhunters in the community gather for special feasts that mark the beginning and end of the hunt (Miller, 1992). In these areas, daily interactions and discourse, as well as strong social support groups that are an important prerequisite for hunting participation (e.g., family, friends, religious and community leaders; Stokowski, 1990), reinforce the importance of hunting and make it salient in the lives of individual residents.

According to cultural materialist theories (e.g., see Harris, 1999), when a behavior such as hunting no longer serves a function that contributes directly to societal health and well-being (i.e., tied to modes of production), it will either be selected against in an evolutionary sense and thereby be eliminated or it will adapt to serve other societal needs. Along with adaptation in function comes a change in the meaning of the activity in societal context. The meaning of hunting today is increasingly tied to higher-order psychological needs, consistent with what Inglehart (1997) refers to as Post-Materialist values (e.g., quality of life, self expression, etc.). This is evident in recent literature reporting the importance of a diversity of hunter motivations – including camaraderie, relaxation and escape from stress, and enjoyment of nature – rather than sole reliance upon bagging game (rooted in a more material need) as a reason for participation (e.g., see Decker, Provencher, & Brown, 1984; Dizard, 2003).

Wildlife Value Orientation Shift. Consistent with what cultural materialism argues is the basis for shifting values (Harris, 1999), the changing function of hunting and its associated meaning has led to a change in the ideology, or set of societal values, that

have come to support its existence. This is evident in the shift in value orientations toward wildlife that is occurring in the United States.

Research suggests that the U.S. public is moving away from a traditional utilitarian orientation toward wildlife, which is rooted in a belief that wildlife should be used and managed for human benefit, toward a more protectionist view of the resource (Manfredo & Zinn, 1996). More specifically, American society is moving away from the value orientation upon which hunting is based (Fulton et al., 1996).

Manfredo, Teel, and Bright (2003) indicate that this shift in wildlife value orientations may be part of the broader shift away from Materialist values to which Inglehart refers. In this context, wildlife value orientations can be viewed as adaptive in the sense that they are tied to the function they serve in a society (e.g., to support hunting), and as needs related to that particular function diminish, the value orientations change. Thus, as material needs (e.g., food) that fostered the development of a utilitarian value orientation toward wildlife are met, the value orientation is gradually replaced by another way of viewing the resource. This is consistent with the observation that in developing societies, where residents are still struggling to meet basic survival needs, wildlife is viewed almost exclusively in a utilitarian light as a source of food and shelter for humans (Witter, 2002). In contrast, wildlife (and hunting) is no longer required by Americans for sustenance, and, consequently, a different set of orientations toward wildlife is evolving in this country.

Manfredo et al. (2003) examined certain societal-level factors that may be affecting this shift in wildlife value orientations observed in the United States. They were guided by Materialist explanations in their selection of factors that are indicative of

changes associated with modernization – changes that are shaping values by defining day-to-day experiences and the cultural environment in which children are raised. Their research revealed that the proportion of "traditionalists" within a state is strongly and inversely related to urbanization, income, and education, and positively related to residential stability (i.e., percent of age spent residing in a state). Traditionalists were defined as those individuals with Materialist values and a utilitarian value orientation toward wildlife.

Study Objectives and Hypotheses

We were directed by these findings in our examination of hunting in the context of the broader cultural changes, including wildlife value orientation shift, outlined above. Our specific objectives were to (1) explore the relationship between hunting and values / wildlife value orientations at the state level, and (2) determine how each of the societal factors that according to Manfredo et al. (2003) are affecting wildlife value orientation shift relates to state-level trends in hunting.

Based on the argument that changes in hunting in the United States are related to changing values and wildlife value orientations, *we hypothesized that active participation in hunting at the state level is related to a greater representation of individuals with traditionalist values* (i.e., defined by a Materialist value set and a utilitarian wildlife value orientation). In addition, we expected that if hunting is in fact associated with value and wildlife value orientation shift, it should also be related to the factors believed to be affecting that shift. Applying the findings of Manfredo et al. (2003), *we hypothesized that active participation in hunting is related to higher levels of income, education, and urbanization and lower levels of residential stability.*

We also expected to find some evidence of these relationships at the individual level of analysis. Research has demonstrated a link between wildlife value orientations and an individual's involvement in hunting (Fulton et al., 1996). Studies have also highlighted the relationship between hunting and certain individual characteristics such as rural v. urban residence and income (e.g., Cordell et al., 1999; Mehmood et al., 2003). We began our investigation with a report on these individual-level relationships to illustrate the typical approach applied by studies exploring the factors related to declines in hunting.

METHODS

Data for this paper were obtained from the pilot phase of a long-term research program designed to assess values, wildlife value orientations, attitudes toward key wildlife management issues and actions, participation in wildlife-related recreation, and sociodemographic characteristics of western publics. The pilot phase was administered in six western states: Alaska, Arizona, Colorado, Idaho, North Dakota, and South Dakota.

Sampling Procedures

The population of interest to this study was defined as adult (i.e., at least 18 years of age) residents in each of the six participating states. The sampling frame consisted of private households with a permanent mailing address in these states. Addresses and phone numbers for a random sample of households, by state, were obtained from Survey Sampling, Inc., a commercial sampling firm.

Data Collection

Data were collected using self-report mail-back questionnaires administered from Colorado State University during March–May, 2002. A modified Dillman (2000)

technique, involving introductory postcards, two complete mailings (i.e., questionnaires with cover letters), and reminder postcards, was used. To obtain approximately equal numbers of male and female respondents, half of the cover letters mailed with questionnaires in each state requested participation by an adult male while the other half requested participation by an adult female.

A nonresponse check survey was administered by telephone to a random sample of nonrespondents in each state. The survey contained eight value orientation questions and three wildlife-related recreation questions, the responses to which were compared with those of respondents to determine if the two groups significantly differed with respect to these constructs.

Measurement

Active Participation in Hunting. Hunting participation was measured using two survey items. First, respondents were asked to indicate whether or not they had ever participated in recreational hunting. Second, they were asked if they had participated during the past 24 months. Responses to each item were coded as "yes" or "no". A new variable classified respondents as either "active" (participated previously and during the past 24 months = 1) or "non-active" hunters (0).

Values. Values were measured using an approach designed by Inglehart (1997) in which respondents are asked to rank a series of goal statements. Instructions prompted respondents to consider these goals as possible priorities for their country over the next ten years. Goals were arranged in three choice sets each of which contained three statements designed to represent Materialist values and three statements representing

Post-Materialist values. Within each set, respondents ranked goals in order of importance with 1 = "most important" (see Manfredo et al., 2003 for a listing of goal statements).

A values index was developed by first summing the importance rankings on the Post-Materialist goal statements across all choice sets. The same procedure was used to sum scores on all Materialist goal statements. The sum of Post-Materialist rankings was then subtracted from the sum of Materialist rankings. In the resulting index (alpha = .69), a negative score indicated a "Materialist" values set, a positive score indicated a "Post-Materialist" values set, and 0 was treated as "Mixed".

Wildlife Value Orientations. Value orientations were measured following the approach designed by Fulton et al. (1996), in which value orientations are identified by composite scales consisting of items that represent basic beliefs. Basic beliefs were measured using 25 of the 35 items developed by Fulton et al. to represent eight basic wildlife belief domains (see Manfredo et al., 2003 for a listing of these items and a description of selection criteria). Consistent with prior research, two orientations were identified, the wildlife appreciation orientation and the protection-use orientation. Because the focus here is on predicting hunting participation which is believed to be more closely related to the protection-use orientation and due to low variance revealed in more recent applications of the appreciation measure (e.g., see Manfredo et al., 2003), we chose to exclude the appreciation orientation from our analyses.

Scores for the protection-use orientation were computed in a two-stage process. First, items were grouped into their basic belief domain and tested for internal consistency using Cronbach's alpha. Alpha values ranged from .56 to .86 across the four domains comprising the protection-use orientation, indicating generally acceptable

reliability of item clusters (Nunnally & Bernstein, 1994). Individual scores were assigned for each domain by taking the mean of responses to items within that domain. In the second stage, belief domains were grouped, and reliability was assessed for the resulting orientation scale which was found to be highly internally consistent (alpha = .88). Scores were assigned for the protection-use orientation by computing the mean of belief domain scale scores. Respondents were further classified as "Protectionists" (scoring 1-3.49 on the 7-point protection-use scale), "Neutral" (3.5-4.49), or "Utilitarians" (4.5-7).

Sociodemographic Characteristics. Sociodemographic characteristics were used at an aggregate level to represent indicators of value shift. These included urbanization, income, education, and residential stability. Level of urbanization was represented by size of current residence. Respondents were asked to select from the following options: "a large city with 250,000 or more people", "a city with 100,000 to 249,999 people", "a small city with 50,000 to 99,999 people", "a town with 10,000 to 49,999 people", "a small town/village with less than 10,000 people", and "a farm or rural area". Income was assessed by asking respondents to select from the following to indicate their annual household income: "less than $10,000", "$10,000 to $24,999", "$25,000 to $49,999", "$50,000 to $74,999", "$75,000 to $99,999", "$100,000 to $124,999", "$125,000 to $149,999", and "$150,000 or more". Education was measured using the following scale from which respondents were asked to select the highest level of completion: "less than high school diploma", "high school diploma or GED", "technical/vocational degree beyond high school", "some college", "4-year college degree", and "advanced degree

beyond 4-year college degree". Residential stability was assessed by dividing duration of in-state residence by age, both reported as direct measures in years.

Population Density and Government Land Ownership. In addition to the variables mentioned above, we decided to include a measure of "supply" in our estimation of factors affecting hunting participation at the societal level. Given that hunting is dependent in part upon access to land areas, it could be argued that differences across states in level of hunting participation might be related to the percent of land available for hunting and also to the numbers of people competing for these limited areas (Cordell et al., 1999). To address this, we included two "supply" variables: (1) the percent of land in a state owned by the government (figures obtained from the National Wilderness Institute [1995]); and (2) state population density, defined as persons per square mile (based on statistics reported from the U.S. Census 2000 [U.S. Department of Commerce, 2002]).

Data Analysis

Values Index. To classify respondents simultaneously on the basis of values and wildlife value orientations, we followed the approach outlined by Manfredo et al. (2003) to create a composite index from the cross-tabulation of the two corresponding typologies. The resulting variable included such categories as "Materialist Utilitarians", "Mixed Utilitarians", "Post-Materialist Utilitarians", etc. We focused on Materialist Utilitarians in our analysis because they represent the traditional values that society is purported to be moving away from – values believed to be related to participation in hunting. A new variable classified respondents as either "Traditionalists" (Materialist Utilitarians = 1) or "Non-Traditionalists" (0).

Individual-Level Analysis. Analysis was conducted at the individual level using logistic regression, a test that is appropriate when the dependent variable, in this case active participation in hunting, is binary (Huck, 2000). Individual-level analysis was conducted in three stages to allow for an examination of the potential mediating effect of values in the relationship between sociodemographic factors and active participation in hunting: (1) regression of values on sociodemographic factors, (2) regression of hunting on sociodemographic factors, and (3) regression of hunting on values and sociodemographic factors. Mediation is established if the following conditions are met: the independent variable affects the mediator (regression 1), the independent variable affects the dependent variable (regression 2), and the mediator affects the dependent variable in the 3rd regression. Full mediation can be demonstrated if the independent variable has no effect on the dependent variable when controlling for the mediator in the final equation (Baron & Kenny, 1986). To examine the contribution of each independent variable in the model, β, the logistic regression coefficient was used.

Aggregate Analysis. Similar to the approach used by Inglehart (1997) and applied in Manfredo et al. (2003), we used aggregate, state-level analysis to test relationships at a broader level. While Inglehart uses countries as the unit of analysis, states are appropriate for the purposes of our research because they have distinct political institutions and authority in setting policy for the management of fish and wildlife within their boundaries and because they typically have distinct environments characterized by certain demographic, economic, and social conditions (Manfredo et al., 2003). These conditions would theoretically influence the development and composition of values among people residing there.

Aggregation eliminates measurement error found at the individual level, thereby allowing for an examination of broader cultural phenomena (Inglehart & Baker, 2000). For this reason, it is a popular technique among cross-cultural researchers, who are interested in characterizing "the broader environmental and social context within which individuals are socialized" (Smith, 2002, p. 2). While some data can be measured directly at the cultural or national level (e.g., gross national product), information on many variables of interest to these researchers (e.g., values) must be collected from individuals – thus the need for aggregation (Smith, 2002).

Some have argued that it is important to be clear about the level of analysis used in comparisons of cultural entities and how aggregate-level data *can and cannot* be used (Hofstede, Bond, & Luk, 1993). Robinson (1950), and later Hofstede (1980), referred to the "ecological fallacy" as a way of explaining what happens when relationships revealed at one level of analysis (e.g., aggregate) are generalized to another level (e.g., individual). It ignores the notion that different causal agents can and typically do influence the same construct (e.g., behavior) at different levels of analysis (Smith, 2002). Robinson (1950), in his classic study on the relationship between literacy and birth place in the U.S., demonstrated this fallacy. At the regional level of analysis, he found a positive association between percentage of foreign-born people and literacy rates; when examining this relationship at the individual level, he found the reverse – people who were native-born were more literate than those who were foreign-born.

While these reversals across levels have been documented, a more typical effect of aggregation, some argue, is an exaggeration of relationships apparent at the individual level. From a statistical standpoint, because it cancels out individual variation,

aggregation may reveal stronger associations among variables than would be expected at the individual level (e.g., see Bronfman & Cifuentes, 2003; Marris, Langford, Saunderson, & ORiordan, 1997).

Given these concerns, it becomes extremely important that the relationships tested at a particular level of analysis match up to theory that specifies these relationships *at that same level of analysis*. As an example, Welzel, Inglehart, and Klingemann (2003) show how a stronger relationship between income and self-expression values revealed at the aggregate level of analysis is consistent with their theory which suggests these relationships are only really apparent when variation across cultural entities (e.g., nations) is taken into account. They argue that weaker relationships involving psychological variables (e.g., value orientations and behaviors) found at the individual level of analysis can reflect a constrained range of variance induced by "mass-level" conditions. Aggregation, then, can make individual-level relationships visible that may otherwise be masked by mass cultural tendencies. In this context, larger correlations at the aggregate level of analysis would not simply be an artifact of the data aggregation method (i.e., spurious correlations). Rather, they represent "real" correlations, adjusted for attenuation.[2]

State-level analysis was used to examine relationships among values, societal-level indicators of value shift, and active participation in hunting. Values were represented as the percentage of Traditionalists within a state, while hunting participation

[2] The correlation between two variables consists of a random element and a systematic element. The random element reflects measurement error, or what may be referred to as "noise" in the data, and it can result in attenuation of the systematic correlation (Blalock, 1961). When data are aggregated, random errors cancel each other out in the sense that positive and negative deviations from the mean outweigh one another (Page & Shapiro, 1993). The systematic correlation then becomes larger, more closely reflecting the "true" correlation by controlling for measurement error (Welzel et al., 2003).

was defined by the percentage of active hunters within a state. To facilitate comparisons across states using sociodemographic characteristics, we created dichotomous variables based on a median split. As an example, education was recoded into a dichotomous variable in which "high education" was defined as at or above the median level ("some college") and "low education" was assigned to those falling below that cut-off for the pooled 6-state sample. Corresponding indicators were expressed in the form of percentages defining the proportion at or above the median across states.

Relationships among variables at the aggregate level were examined using Pearson's correlation coefficient (r) calculated for each bivariate comparison (e.g., between active participation in hunting and education). The sample size we obtained for aggregate-level analysis (n = 6 states) precluded our ability to run more advanced statistical testing at the multivariate level to estimate unique contributions of hypothesized factors on hunting participation. Some might even question our use of parametric statistics for bivariate comparisons, arguing that non-parametric tests are required with sample sizes of six or less due to concerns about violating assumptions associated with parametric tests (e.g., normality) at this level (Huck, 2000). However, in a study examining the effects of the violation of assumptions of normality on Pearson's correlation coefficient, Havlicek and Peterson (1977) found this statistic to be insensitive to extreme violations across sample sizes ranging from 5 to 60. Hittner, May, and Silver (2003) recently extended this work and confirmed the robustness of Pearson's r to violations believed to be associated with small sample sizes.

RESULTS

We obtained an overall response rate of 35% (n = 3216) for the mail-back questionnaire. Rates ranged from 32% to 38% across participating states. The nonresponse check survey (n = 2204, 75% response rate) revealed that, while respondents and nonrespondents did not significantly differ on wildlife value orientations, statistically significant differences existed between the two groups with respect to participation in wildlife-related recreation. Findings also revealed that our sample was underrepresented by younger age categories and females. Data were weighted by state to account for these differences using nonresponse check information and state population estimates of age and gender obtained from the U.S. Census 2000 (U.S. Department of Commerce, 2002).

Descriptive Statistics: Active Hunters

Overall, 26% of respondents were classified as active hunters. Percentages varied by state, with Alaska containing the highest representation of active hunters (34%) and Colorado containing the lowest (13%; Table 3).

Individual-Level Analysis

With the exception of urbanization, which did not have a significant impact on values, all sociodemographic factors were significantly related to both traditionalist values and active participation in hunting at the individual level (Table 4; Figure 4). Consistent with what we expected to find at an aggregate level, education was negatively related to hunting and values, and residential stability was positively related to these measures. Urbanization was negatively related to hunting in the model. Also consistent with aggregate-level hypotheses, traditionalist values were positively related hunting.

In contrast to what we would expect at an aggregate level, but consistent with some of the literature on factors affecting an individual's decision to participate in hunting (e.g., see Mehmood et al., 2003), we found a positive relationship between income and active participation in hunting and also between income and values at the individual level.

The three equations calculated using logistic regression to test for mediation revealed that values partially mediate the relationship between the following sociodemographic factors and hunting: education, income, and residential stability (Table 4). These sociodemographic predictors were significantly related to values (regression 1) and to hunting (regression 2), and their relationship with hunting was slightly attenuated, though not constrained to zero, when controlling for the effect of values in the overall model (regression 3). The percent of cases correctly classified in the model explaining variation in traditionalist values was 57%, while the percent correctly classified in the model designed to predict hunting participation was 74%, with the largest contribution made by the mediator (values, $\beta = .93, p < .001$).

Aggregate Analysis: Factors Related to Hunting

Bivariate comparisons at the aggregate level revealed a positive relationship between active participation in hunting and the percent of Traditionalists in a state (Table 5). Arizona and Colorado had the lowest percentages of Traditionalists and also the lowest percentages of active hunters (Table 3; Figure 5). In contrast, North Dakota and

South Dakota, both of which had the highest percentage of Traditionalists, had the highest representation by active hunters behind Alaska.[3]

Consistent with study hypotheses, education, income, and urbanization were negatively related to active participation in hunting. Population density, a supply measure, was also negatively related to hunting. In fact, based on the absolute value of *r* (.98), population density had the largest effect size of all variables in relation to the dependent measure. The other measure of supply, percent of land owned by the government in a state, had a negligible impact ($r = -.01$). Our final indicator, residential stability, was positively related to active participation in hunting.

DISCUSSION

While a number of studies have attempted to address the decline in hunting participation in the United States, few have gone beyond an examination of individual-level factors (e.g., constraints) believed to affect the sport. While this previous body of research is useful in that it provides an indication of conditions that may impact recreation participation on an individual basis, it tends to ignore the cultural context that is key to understanding the future of hunting in contemporary America. We contend that explaining declines in hunting demands a macro-level perspective, recognizing that changes in hunting behavior are related to *cultural* change that occurs at a broader, societal level. Specifically, we argue that an understanding of value shift in American

[3] Alaska appeared as "an outlier" in many of our analyses, including this one. While further research is necessary to determine why this occurred, the authors feel it may be due to unique environmental and economic conditions that have helped shape values among Alaska residents. Interestingly, compared to other states included in this study, Alaska had the highest representation of individuals with Post-Materialist values and a utilitarian wildlife value orientation. Additionally, it is likely that hunting is defined somewhat differently in Alaska, where there is a tremendous abundance of the wildlife resource relative to other states and where hunting is far more functional with respect to subsistence needs.

society and the factors related to that shift lends itself to a greater awareness of the factors affecting trends in hunting participation in this country.

Research indicates that participation in hunting is rooted in a utilitarian value orientation toward wildlife (Fulton et al., 1996). Research also suggests that the U.S. public is moving away from an emphasis on this more traditional orientation toward a more protectionist view of the resource (Manfredo & Zinn, 1996). Contemporary theories of culture change, advanced largely by Inglehart (1997), suggest that this shift in orientations may be related to shifting need states tied to economic forces associated with modernization, including changing modes of production. Economic advancement has promoted movement away from a focus purely on basic survival needs toward an ability to give emphasis to higher-order concerns that Inglehart terms Post-Materialist values (e.g., quality of life). Tied to these changes is a change in the function and associated meaning of hunting in contemporary American society.

In an application of these ideas, and as an extension of research reported in Manfredo et al. (2003), we examined the relationship between hunting and certain societal-level factors – urbanization, income, education, and residential stability – believed to be indicative of forces associated with modernization and therefore related to value shift in the United States. Using data collected in six western states, we conducted analyses at both the individual and aggregate (i.e., state) level of analysis to demonstrate the utility of our approach. Findings revealed a strong positive relationship between active participation in hunting and possession of traditional values (defined by a Materialist values set and a utilitarian orientation toward wildlife). Results also showed

that active participation in hunting is inversely related to income, education, and urbanization, and positively related to residential stability at the aggregate level.

Reported relationships at the individual level were consistent with these findings, with the exception that income was positively related to active participation in hunting. This latter finding is not surprising given the mixed evidence for income reported in the literature on individual-level effects on hunting (e.g., see Heberlein & Thomson, 1996; Mehmood et al., 2003; U.S. Department of the Interior, Fish and Wildlife Service, 2002). In this case, as individual variation is eliminated with aggregation, we may be getting a clearer picture of the effect that income has on hunting. Differences across the two levels of analysis may also reveal that there are different forces at work at the individual as opposed to state level. While higher income may be associated with an individual's ability and subsequent decision to hunt, a greater income level for a given state could be indicative of an environment which Inglehart (1997) would argue fosters development of less traditional values (i.e., as opposed to values more closely tied to hunting).

Our sample at the aggregate level, consisting of only six participating states, limited our ability to test study hypotheses in an overall multivariate framework. For example, while we were able to demonstrate the mediating effect of values in the relationship between sociodemographic factors and hunting at the individual level, we were unable to test for mediation in state-level analyses. Future investigations of this nature would obviously benefit from *longitudinal* research conducted across a *greater number* of states. However, our research provides a basis for the kinds of questions we need to be asking when attempting to understand the future of hunting in this country. For example, it points to the need to identify other societal-level factors that may be

affecting value shift and how those factors are estimated to change in the future. As our research suggests, these changes will likely have implications for future involvement in wildlife-related recreation activities like hunting.

It is important to note that a continued decline in hunting is not necessarily what will happen in the future. While this may seem reasonable given a continuation of past trends in certain societal factors like urbanization and income, hunting is not likely to go away – it is an activity that has cultural significance to many Americans (Decker et al., 2001; Lamar & Donnell, 1987). As Theodore Roosevelt argued in the late 19th century, hunting is part of what it means to be an American (Herman, 2001).

Although hunting is not likely to disappear in this country, its future is somewhat vulnerable in the sense that it is no longer tied directly to what cultural change theories argue are the "essential movers" of society – the forces (e.g., modes of production) that allow a society to prosper and grow. While many of the rituals and myths that evolved to support its existence remain strong, particularly in rural communities, the function of hunting is no longer linked to the overall health and economic well-being of this country. Its future therefore will depend on how well it fits into the changing fabric of American society – its shifting economic and demographic environment and the associated change in public values and value orientations. While this suggests that many of the factors related to hunting are largely beyond the control of state wildlife management agencies, a better understanding of them can help agencies and others with economic ties to the sport prepare for what the future might hold.

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Table 3. Percent distribution of active hunters, Traditionalists, and levels of hypothesized indicators[1] across states

States	% Active Hunters[2]	% Traditionalists[3]	% Highly Educated	% High Income	% Urban	% High Residential Stability	% Govt. Land	Population Density
Alaska	34	54	96	62	29	26	96	1
Arizona	14	49	57	53	71	32	57	45
Colorado	13	45	43	65	55	43	43	42
Idaho	31	59	70	46	25	52	70	16
North Dakota	31	65	9	39	13	70	9	9
South Dakota	33	65	8	39	19	73	9	10

[1]Indicators were defined as follows: demographic indicators were coded based on a median split ("high" = greater than or equal to median, "low" = less than median); percent government land was represented by the percent of state land owned by the government according to 1995 estimates from the National Wilderness Institute; population density was defined as persons per square mile based on statistics reported from the U.S. Census 2000 (U.S. Department of Commerce, 2002).
[2]Active hunters were defined as those who indicated they had participated in recreational hunting previously and also within the last 24 months.
[3]Traditionalists were defined as those with a Materialist values set and a utilitarian (use) orientation toward wildlife.

Table 4. Logistic regression results for tests of mediation at the individual level[1]

Regression Model Variables Included[2]	*β*	*p*
(1) Regression of values on sociodemographics		
Education	-.59	< .001
Income	.34	< .001
Urbanization	-.16	.108
Residential Stability	.37	< .001
Percent correctly classified by the model	**57%**	
(2) Regression of hunting on sociodemographics		
Education	-.44	< .001
Income	.52	< .001
Urbanization	-.86	< .001
Residential Stability	.51	< .001
Percent correctly classified by the model	**73%**	
(3) Regression of hunting on values and sociodemographics		
Education	-.39	.001
Income	.50	< .001
Urbanization	-.84	< .001
Residential Stability	.49	< .001
Values	.93	< .001
Percent correctly classified by the model	**74%**	

[1]For the analysis shown here, Colorado's sample size was weighted by 1/3 (in addition to other weighting procedures described in the results section) to adjust for its increased sample size, relative to other states, resulting from stratification.

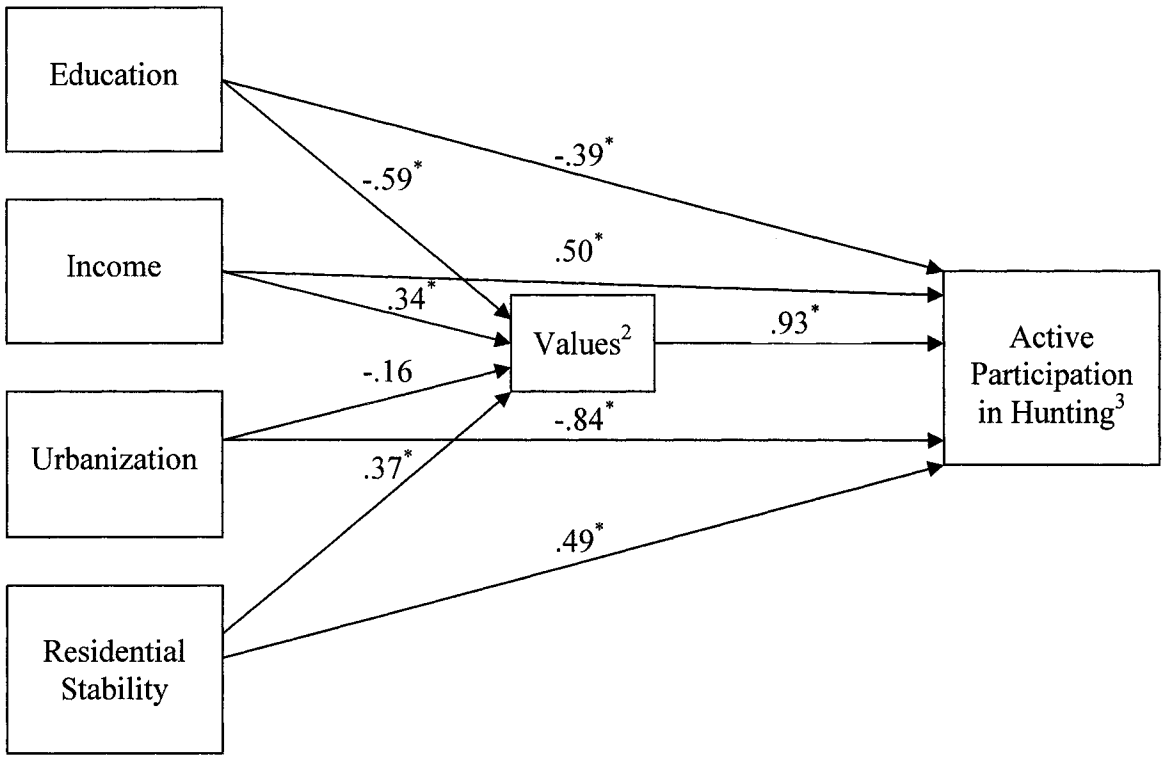
[2]Demographic indicators were coded based on a median split (1 = "high", defined as greater than or equal to median; 0 = "low", defined as less than median). Respondents were classified based on values in the following manner: 1 = "Traditionalist", defined by a Materialist values set and a utilitarian (use) orientation toward wildlife, 0 = "Non-Traditionalist". Respondents were classified as either "active hunters", defined as those who indicated they had participated in recreational hunting previously and also within the last 24 months (1), or "non-active hunters" (0).

Table 5. Bivariate correlations among hypothesized indicators, values, and active participation in hunting at the state level (aggregate analysis)

Indicators[1]	Percent Traditionalists[2]	Percent Active Hunters[3]
Percent Highly Educated	-.97*	-.80*
Percent High Income	-.92*	-.54
Percent Urban	-.88*	-.92*
Percent High Residential Stability	.81*	.40
Percent Government Land	-.54	-.01
Population Density	-.73	-.98*
Percent Traditionalists	—	**.81***

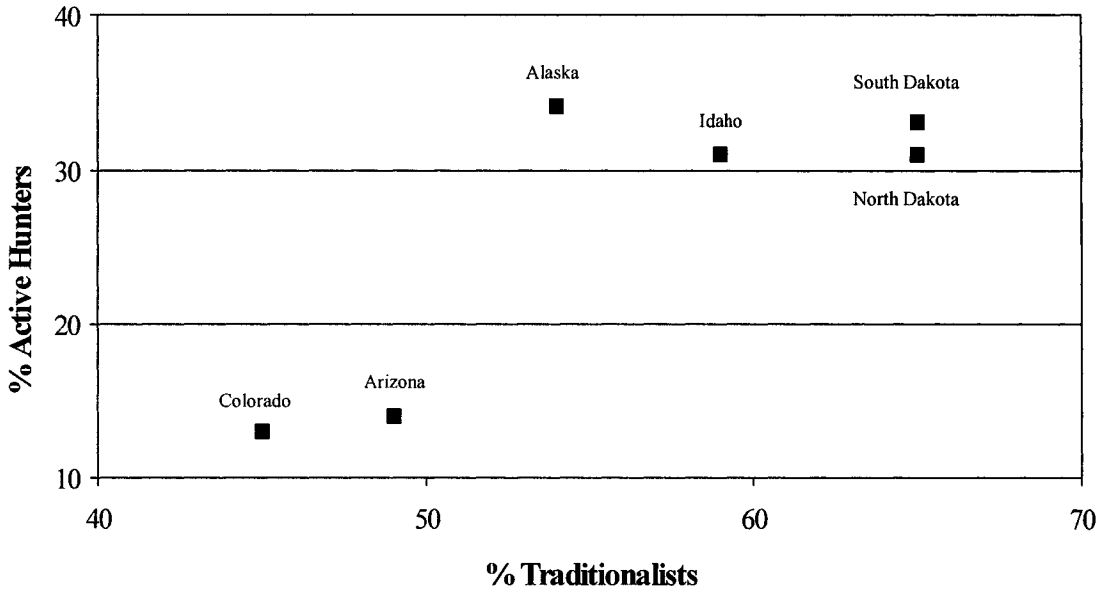
[1]Indicators were defined as follows: demographic indicators were coded based on a median split ("high" = greater than or equal to median, "low" = less than median); percent government land was represented by the percent of state land owned by the government according to 1995 estimates from the National Wilderness Institute; population density was defined as persons per square mile based on statistics reported from the U.S. Census 2000 (U.S. Department of Commerce, 2002).
[2]Column reports Pearson's *r* for the zero-order correlation between percent of Traditionalists by state and hypothesized indicator. Traditionalists were defined as those with a Materialist values set and a utilitarian (use) orientation toward wildlife.
[3]Column reports Pearson's *r* for the zero-order correlation between percent of active hunters by state and hypothesized indicator. Active hunters were defined as those who indicated they had participated in recreational hunting previously and also within the last 24 months.
*Correlation significant at $p < .05$ (one-tailed).

Figure 4. Relationship among hypothesized indicators, values, and active participation in hunting at the individual level[1]



[1]Path coefficients displayed in figure are beta weights (β) calculated using logistic regression. For the analysis shown here, Colorado's sample size was weighted by 1/3 (in addition to other weighting procedures described in the results section) to adjust for its increased sample size, relative to other states, resulting from stratification. Demographic indicators were coded based on a median split (1 = "high", defined as greater than or equal to median; 0 = "low", defined as less than median). Respondents were classified based on values in the following manner: 1 = "Traditionalist", defined by a Materialist values set and a utilitarian (use) orientation toward wildlife, 0 = "Non-Traditionalist". Respondents were classified as either "active hunters", defined as those who indicated they had participated in recreational hunting previously and also within the last 24 months (1), or "non-active hunters" (0).
[2]Percent correctly classified in model = 57%.
[3]Percent correctly classified in model = 74%.
*$p < .001$

Figure 5. Percent Traditionalists by percent active participation in hunting across states[1]



[1] $r = .81$, significant at $p < .05$.

IV. CONCLUSION

The two papers included in this dissertation enhance our theoretical understanding and application of the concept of wildlife value orientations. They do this in two ways: (1) by contributing to our knowledge of the basis for wildlife value orientations as part of an individual's hierarchical belief structure, and (2) by exploring the broader cultural context that defines wildlife value orientations and related constructs (e.g., values and behaviors).

Summary and Integration of Findings

Since the development of the concept of wildlife value orientations (Fulton, Manfredo, & Lipscomb, 1996) as a means of capturing the broad array of specific values people hold toward wildlife, the focus of subsequent research has primarily been on explaining variation in specific wildlife-related attitudes and behaviors (e.g., see Manfredo & Zinn, 1996; Whittaker, 2000). This research assumes that wildlife value orientations are part of a hierarchical belief structure consisting of several different types of inter-related cognitions (Fulton et al., 1996; Homer & Kahle, 1988). As such, they are thought to be an expression of an individual's more fundamental values and to in turn affect higher-order cognitions, including attitudes, norms, and ultimately behaviors. While research has demonstrated the predictive validity of wildlife value orientations in terms of explaining higher-order attitudes and behaviors, little attention has been paid to understanding the basis for wildlife value orientations themselves.

Chapter II addressed this research need in testing the extent to which wildlife value orientations are related to more fundamental values. Specifically, the paper revealed a relationship between a utilitarian versus protection orientation toward wildlife and Materialist/Post-Materialist values. The latter construct is central to a theory on value shift developed and tested cross-culturally by Inglehart (1997), who maintains that economic development tied to industrialization and the processes that followed have elevated people in the U.S. from basic human material needs (e.g., safety, physical security) to higher-order psychological needs which he terms Post-Materialist values (e.g., quality of life, self expression). Study findings reported in Chapter II revealed that individuals with a Materialist value set were more likely than Post-Materialists to have a utilitarian orientation toward wildlife.

Chapter II also tested the predictive validity of an overall model containing both values and wildlife value orientations in explaining variation in support for wildlife management actions. This exploration was based on the assumption that if wildlife value orientations are in fact related to more basic values, the latter should aid in predicting support for management actions and that, consistent with the notion of a cognitive hierarchy, value orientations should mediate this relationship. The model was tested across three different wildlife management-related "scenarios" that dealt with specific issues – stocking of hatchery-raised trout in areas where they may interfere with survival of native fish species, control of coyotes, and funding for wildlife viewing program development. Survey respondents read a description for each scenario and then rated the acceptability of a set of actions associated with each.

Across all three scenarios, values and wildlife value orientations were significantly related to support for wildlife management actions. Those with a Materialist values set were more likely than Post-Materialists to support fish stocking and lethal control of coyotes and less likely than their counterparts to support a variety of funding mechanisms for wildlife viewing program development. Furthermore, individuals with a utilitarian wildlife value orientation responded in a manner similar to those with a Materialist values set – i.e., they were more in favor of fish stocking and lethal coyote control and less supportive of wildlife viewing funding – while responses of individuals with a protectionist orientation toward wildlife were generally consistent with those of Post-Materialists. Wildlife value orientations were found to partially mediate the relationship between values and support for management actions.

While Chapter II enhances our understanding of how wildlife value orientations relate to other, more fundamental cognitions at an individual level, Chapter III contributes to our understanding of how wildlife value orientations are also part of a broader cultural context operating outside of the immediate control of the individual. This chapter applied the concept of wildlife value orientations as well as Materialist theories of cultural change (e.g., see Harris, 1999) to explore the factors that may be related to declines in hunting participation in the U.S. Although a number of studies have attempted to address the decline, few have gone beyond an examination of individual-level factors (e.g., constraints) believed to affect the sport. While this previous body of research is useful in that it provides an indication of conditions that may impact recreation participation on an individual basis, it tends to ignore the notion that changes

in hunting behavior may be related to broader, cultural changes including a shift in public values like that described by Inglehart (1997).

To attend to these ideas, Chapter III examined the relationship between hunting and certain societal-level factors – urbanization, income, education, and residential stability – believed to be indicative of forces associated with modernization and therefore related to value shift in the United States. Findings revealed a strong positive relationship between active participation in hunting and possession of traditional values (defined by a Materialist values set and a utilitarian orientation toward wildlife). Results also showed that active participation in hunting is inversely related to income, education, and urbanization, and positively related to residential stability at the aggregate level.

Management Implications

Our findings are consistent with other studies that have highlighted the role that wildlife value orientations can play in influencing attitudes and intentions toward wildlife management proposals and participation in wildlife-related recreation activities such as hunting (e.g., Fulton et al., 1996; Manfredo, Pierce, Fulton, Pate, & Gill, 1999). Overall, this research suggests that those with a utilitarian orientation toward wildlife are more likely than those with a protectionist view to participate in activities like hunting and to support certain traditional agency programs and activities (e.g., lethal wildlife control measures). Chapter II also suggests that individuals with a Materialist value set are more likely than Post-Materialists to have a utilitarian orientation toward wildlife and to behave or react in this manner.

These findings have important implications for the future of wildlife management, particularly in the context of changing values and wildlife value orientations. Society is

purportedly moving away from a traditional orientation toward wildlife toward a more protectionist view of the resource (Manfredo & Zinn, 1996). Additional research suggests movement away from emphasis on Materialist concerns toward greater expression of Post-Materialist values (Inglehart, 1997). As our findings suggest, along with these changes may come greater opposition to traditional forms of wildlife management. In addition, there may be less of a demand for provision of certain use-oriented activities and experiences (e.g., hunting). The challenge for fish and wildlife agencies will be to respond to the needs and interests of an emerging class of people – those who emphasize quality of life concerns and who view the resource less in terms of how it can be used for human benefit and more in terms of our need to protect it. As an example, Chapter II suggests a greater interest in agency provision of wildlife viewing opportunities among these individuals. Declines in participation in certain traditional forms of recreation like hunting may therefore be offset by a greater demand for viewing. However, agencies continue to rely heavily on hunting and fishing license dollars (U.S. Department of the Interior, Fish and Wildlife Service, 1999) and will likely struggle to find innovative ways for funding these new programs.

Tied to this, our findings reported in Chapter III could suggest continued declines in hunting if certain societal trends are maintained. For example, if some of the demographic trends tied to modernization, including increasing affluence and urbanization, continue, we might also expect a continued erosion of traditional values and wildlife value orientations and a decrease in hunting participation. As mentioned above, the activity may be replaced by a new set of interests that is more in line with Post-Materialist needs and the emergence of a protectionist view of wildlife. While hunting is

not likely to disappear entirely – as it is an activity that continues to have cultural significance to many Americans, particularly in rural areas – its future is somewhat vulnerable. The function of hunting is no longer linked to the overall health and economic well-being of this country. Its persistence therefore will depend on how well it fits into the changing fabric of American society – its shifting economic and demographic environment and the associated change in public values and value orientations.

Theoretical Implications and Future Research Direction

Our findings also have certain theoretical implications tied to a broadened perspective on the concept of wildlife value orientations, and they highlight certain areas necessary for further investigation. The inclusion of a measure designed to represent more basic values in our model enhances our understanding of the psychological basis for wildlife value orientations, and, in turn, for specific evaluations of management actions. It provides greater consistency and predictability with respect to understanding diverse patterns of wildlife-related attitudes and behaviors. Across several types of wildlife management actions, we were able to provide evidence of the inter-related nature of different types of cognitions – cognitions shown to be rooted at the most basic level in individual values. These findings expand the current knowledge on how wildlife value orientations function and how they relate to other concepts in a hierarchical framework.

Findings reported here also contribute to our understanding of how wildlife value orientations might relate to other variables at a broader, societal level. Wildlife value orientations in the U.S. are changing. This shift is likely related to a number of other cultural trends, including the shift toward Post-Materialist values identified by Inglehart (1997), and declining participation in hunting. As Chapter III suggests, these inter-

related variables – i.e., values, wildlife value orientations, and hunting – are part of a broader cultural context defined by societal-level forces, including urbanization, changes in modes of production, and rapid technological and economic growth. Recognition of a broader cultural context surrounding wildlife-related ideology means that future investigation in this area will benefit from an attempt to take into account macro-level perspectives.

Much of the research in the human dimensions of wildlife arena has focused on providing micro-level explanations for wildlife-related attitudes and behaviors. It often attempts to explain, for example, why individuals support or oppose certain management strategies and why they choose to become involved or to no longer participate in wildlife-related recreation activities. As Chapter II illustrated, the concept of wildlife value orientations, enhanced by an understanding of the basis for those orientations, is one variable that has proven useful in this context. There are also a number of other types of variables that have been explored, as evidenced, for example, by the multitude of factors (e.g., sociodemographic and lifestyle characteristics) shown to be empirically related to declines in hunting participation.

This collection of research provides interesting answers to individual-level phenomena and helps in our attempts to understand and communicate with various publics. However, as the findings presented here suggest, there is *also* a need to seek macro-level explanations. Though further exploration is necessary to verify and expand upon relationships reported in Chapter III, our findings, in addition to those reported by Manfredo, Teel, & Bright (2003), provide a basis for the kinds of questions we need to be asking in future research endeavors at the macro-level. For example, they point to the

need to identify other societal-level factors that may be affecting wildlife value orientation shift and how those factors are estimated to change over time. As the collection of papers presented here suggests, these changes could have dramatic implications for the future of wildlife management in this country.

Our investigation also points to a need to more thoroughly explore how changes in wildlife value orientations are related to other cultural changes. For example, are the factors that have shaped the evolution of wildlife value orientations in this country the same as those that have affected the current mix of certain types of values in contemporary society? The wildlife value orientation shift occurring in the U.S. seems related to and consistent with the movement toward emphasis on Post-Materialist values that Inglehart (1997) describes. But to what *extent* are these two trends related? Are there additional factors and time frames that are unique to each of these movements? This investigation will require a more thorough analysis from an historical perspective of the evolution of the wildlife/animal protectionist movement, including an identification of its driving forces.

A final area that warrants attention in future research is a cross-cultural examination of wildlife value orientations. If wildlife value orientations are related to a broader ideology that is shaped by certain cultural and environmental factors, how do these orientations differ across different societies? Manfredo and Dayer (2004, in press) highlight several priorities for cross-cultural investigation, including a determination of the applicability of the protection-use orientation outside of North America and an identification of alternative ways for viewing the resource in different societies. There is also a need for investigating the utility of various methodological approaches to

measuring wildlife value orientations cross-culturally. Addressing these research priorities will aid in our attempts to understand the forces that affect wildlife value orientations at a societal level – forces that ultimately affect how wildlife is managed both nationally and internationally.

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