

NATURE-BASED RECREATION AND SUPPORT FOR CONSERVATION:
A MIXED-METHODS APPROACH TO UNDERSTANDING
MICHIGAN OUTDOOR ENTHUSIASTS

By

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ABSTRACT

NATURE-BASED RECREATION AND SUPPORT FOR CONSERVATION: A MIXED-METHODS APPROACH TO UNDERSTANDING MICHIGAN OUTDOOR ENTHUSIASTS

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This dissertation research sought to contribute knowledge to the field of human dimensions of wildlife conservation by improving understanding of the psychological and behavioral foundations of human-nature interactions; nature-based outdoor recreationists in Michigan were used as a study population. I developed a mixed-methods approach and collected data through in-depth interviews and a web-based questionnaire. Research phase one involved qualitative exploration of the meanings and motivations for participation in nature-based outdoor recreational activities. I conducted in-depth interviews with birdwatchers (n=15) and mountain bikers (n=15) throughout Michigan in May – July 2019. Interviewees indicated that multiple cognitive, emotional, social, and place-based motivational frames shaped their expectations for recreating in nature. Interviewees' goals shifted through time as they gained experience and knowledge from activity-specific goals (e.g., identify more birds, ride further distances, etc.) to satisfy more fundamental needs such as self-efficacy, social connection, family functioning, and restoration. Conceptualizations of environmental stewardship and conservation depended on group-level socialization in the birding or mountain biking communities and individual motivations and ethics. Higher order meanings of (re)connection to oneself, other people, and nature emerged through experiential feedbacks and repeated participation over time.

Research phase two used a web-based survey of nature-based recreationists (n=19,143) sampled from an e-mail database managed by the Michigan Department of Natural Resources in

June – August 2020. I analyzed data obtained from the survey to quantify and model relationships between participation in nature-based outdoor recreational activities and support for conservation efforts. I operationalized support for conservation in two ways: (1) stated intention to support alternative conservation funding policies and (2) reported engagement in stewardship (measured by pro-environmental behaviors (PEBs)). Results of binary logistic regression modeling suggested different variables influence support for alternative conservation funding policies, and that support depends on whether the proposed policy is a general or user-based tax. Mutualist value orientations, past stewardship engagement, and knowledge of conservation funding mechanisms generally increased support for novel funding policies, while domination value orientations, social capital, and age generally decreased support. Overall, the stakeholders surveyed supported proposed policies to increase funding for conservation from general sources of taxation or an extractive-industry contribution but opposed a user-based tax on general outdoor gear (i.e. backpack tax). A structural equation model was used to quantify relationships between nature-based recreationists and stewardship engagement such as voting to support policies or regulations that affect wildlife, wildlife habitat improvement on private land, volunteerism, donating money to conservation organizations, or participating in wildlife conservation meetings. Results indicated that wildlife value orientations, recreational place attachment, specialization, and motivations influenced engagement in stewardship activities that benefit wildlife. The strongest predictors of engagement in stewardship behaviors were mutualistic values toward wildlife and “nature” or “social” dimensions of recreational motivations as measured by recreation experience preference (REP) scales.

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KEY TO ABBREVIATIONS

AVE – Average variance extracted

CFA – Confirmatory factor analysis

CR – Composite reliability

HD – Human Dimensions

LWCF – Land and Water Conservation Fund

MDNR – Michigan Department of Natural Resources

OIA – Outdoor Industry Association

PEB – Pro-environmental behavior

PERM – Partnership for Ecosystem Research and Management

PR – Pittman-Robertson Act

PTD – Public Trust Doctrine

SEM – Structural equation modeling

SWA – State wildlife management agency

USFWS – U.S. Fish and Wildlife Service

WLD – Wildlife Division

WVO – Wildlife Value Orientations

CHAPTER 1: INTRODUCTION

“The basic issue in wildlife conservation is whether machine-made man, who outnumbers us five to one, really cares enough about wild things to steer the industrial juggernaut around our interests.”

- Aldo Leopold, 1935

Background

Nature-based outdoor recreationists represent important constituencies for state and federal natural resource agencies and associated partners whose relationship to conservation is not well understood. Segments of nature-based recreationists are thought to hold stronger environmental attitudes due to their proximity to and dependence on nature (Dunlap & Heffernan, 1975), making them potential allies in support of efforts to manage public land, mitigate negative environmental impacts, and achieve conservation goals valued by society. Moreover, many natural resource agencies rely on financial support provided by recreationists in the form of voluntary donations, excise taxes, and user fees to carry out the work of conservation and management (Anderson & Loomis, 2006). Recreationists are a heterogeneous group, however, and the nature of their values, attitudes, and behaviors related to support for conservation are uncertain (Theodori et al., 1998).

Cultural and socio-demographic changes in the United States have fueled a shift from consumptive activities (e.g., hunting and angling) resulting in new emerging modes of human-wildlife interactions (Lischka et al., 2018), and prompting state agencies such as the Michigan Department of Natural Resources (MDNR) to devote resources to understanding and predicting participation trends. State wildlife management agencies (SWAs) depend on revenue from hunting license sales and excise taxes to achieve wildlife management and conservation goals (Arnett & Southwick, 2015). Conventional practices in wildlife management emphasize

contributions from hunters and other consumptive recreationists (e.g., angling, trapping) to provide revenue and participate in population management through regulated game harvest (Campbell & Mackay, 2003).

While participation in hunting has declined nationally by approximately 30% since the 1980s, non-consumptive wildlife recreation has increased in popularity (Cordell, 2008); one-third of the U.S. population in 2016 reported watching wildlife as a recreational activity away from the home (USFWS, 2018). Projections suggest that continued declines in hunting are likely, and primarily driven by broad demographic changes in society (Winkler & Henderson, 2015). Demographic shifts that contribute to changing recreational preferences include an aging baby boomer population that has historically provided a disproportionate abundance of hunters (Winkler & Warnke, 2013), urbanization (Patterson et al., 2003), increasing ethnic diversity (Camarillo et al., 2020), and macro-level changes in dominant value orientations (Inglehart & Baker, 2000; Manfredi et al., 2009), all of which influence the ways people interact with wildlife and the natural environment.

As participation in non-consumptive forms of recreation (e.g., hiking, birdwatching) has increased, management goals diversified from providing game for harvest and preventing damage to agricultural crops to include providing experiences that satisfy a multitude of social, psychological, and physical goals (Driver & Tocher, 1970; Hendee, 1974; Duffus & Dearden, 1990). Understanding the characteristics of stakeholders who desire a diversity of experiences that fit with their goals and values is a key challenge for practitioners, managers, and trustees of wildlife resources (Zinn et al., 2000; Chase et al., 2004). Wildlife are considered public resources managed for public benefit, reflecting a central tenet of wildlife management known as the public trust doctrine (PTD) (Horner, 2000). Public acceptance of management actions,

compliance with regulations, and support for conservation objectives might depend on integrating more diverse perspectives into decision making processes, thereby reflecting an accurate and inclusive representation of values, beliefs, and ideologies present among wildlife stakeholders (Holsman & Peyton, 2003; Schroeder et al., 2021). Broader strategies may be needed to recruit a diversity of wildlife enthusiasts and nature-based recreationists and ensure the needs of all beneficiaries of public resources are adequately represented in governance frameworks and decision-making (Decker et al., 2016).

The ability to continue to provide access to wildlife resources and satisfactory recreational experiences depends in part on finding sustainable sources of funding robust to changing values, desires, and relationships with wildlife across different segments of society. Future funding for wildlife conservation might require the participation and support of a broad coalition of conservation advocates, state and federal agencies, NGOs, business and industrial sectors, landowners, and the general public (AFWA, 2019). However, institutional barriers often present significant obstacles to adaptation, necessitating strategic planning and partnerships to collaboratively address institutional constraints (Jacobson et al., 2007).

Greater stakeholder participation is thought to lower the barriers to effective adaptation, yet questions regarding characteristics of diverse wildlife stakeholders that may enable or facilitate support for wildlife conservation are generally unresolved. Shifting interests in recreation, a changing demographic landscape, increasingly severe effects of climate change, and commodification of nature point to unique challenges to maintaining equitable access to nature-based experiences (Louv, 2008; Kellert et al., 2017). Additionally, solving contemporary threats to biodiversity (e.g., climate change, human population growth) requires novel approaches to conservation that incorporate normative, regulatory, and structural interventions aimed at

changing behavior (Callicott et al., 1999; Echols et al., 2019; Muhumuza & Balkwill, 2013; Schultz, 2011).

Study purpose and objectives

The challenges faced by wildlife and conservation professionals associated with an ever-expanding suite of stakeholder demands, shifting demographics in society, calls for more equitable governance of wildlife resources, and inadequate conservation funding are multi-tiered and represent “wicked problems” in natural resource management (Balint et al., 2011). The solutions to such problems often lack integrated theories or clear approaches to orient research and practice. Integrating human dimensions insights into the development of wildlife management frameworks has long been a goal of the conservation profession, yet challenges remain in utilizing normative, or values-based approaches to understanding and interacting with wildlife stakeholders (Bennett et al., 2017).

The research reported in my dissertation seeks to add knowledge and clarity to determinants of stakeholder support for conservation using social science methods developed in the field of human dimensions. My findings further seek to improve the capacity of SWAs and other organizations to anticipate and respond to changes in society that are affecting wildlife, ecosystems, and the broader outdoor recreation community. My dissertation research is guided by four primary objectives:

1. Explore motivations and barriers for participation in nature-based recreation from the perspective of non-traditional stakeholders.
2. Investigate support for alternative conservation funding policies among nature-based recreationists.

3. Assess the social psychology of engagement in stewardship behaviors that benefit wildlife and associated habitats.
4. Identify opportunities for interventions that increase retention of general outdoors enthusiasts and implications for management practitioners.

Conceptual background

Conceptual frameworks rooted in social psychological theories guided my approach to data collection and analysis. I developed a conceptual map (Figure 1.1) to organize independent and dependent variables, generate testable hypotheses, and ensure study design is consistent with existing theory.

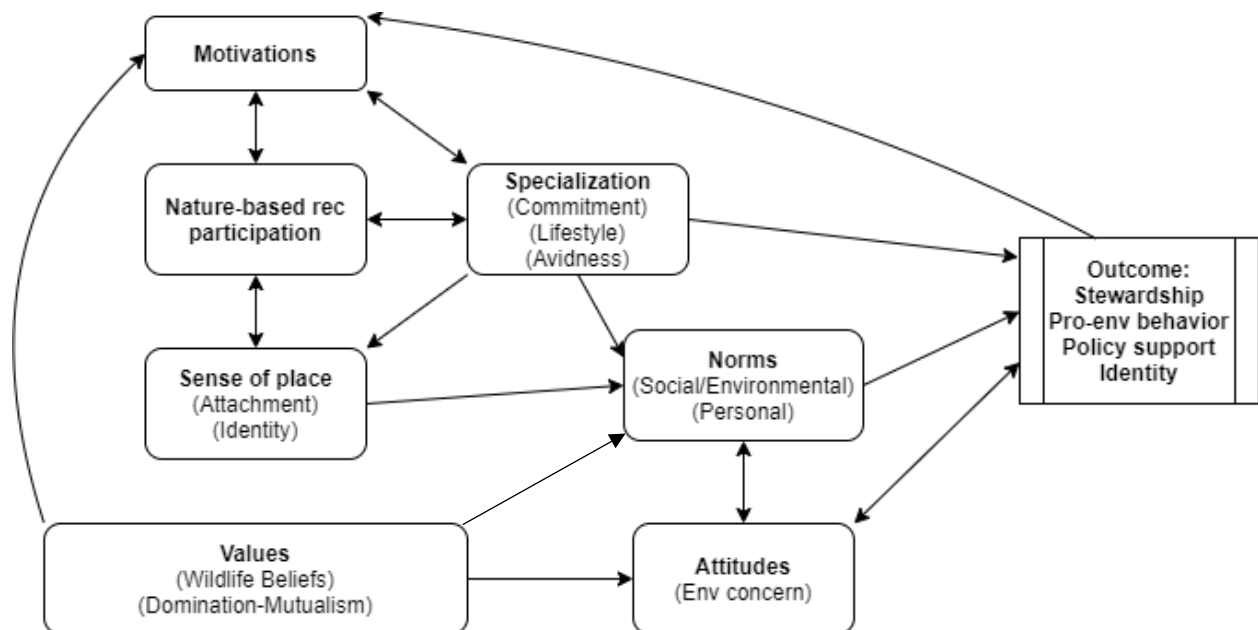


Figure 1.1: Conceptual map guided dissertation data collection and analysis based on prior theoretical frameworks.

The primary source of environmental degradation and the basis for interventions that benefit wildlife and ecosystems is human behavior (Schultz, 2011). Understanding human choices and identifying potential ways to alter behavior to produce desired outcomes necessitates

understanding the psychological and emotional basis for thought and action (Ehrlich & Kennedy, 2005). Cognitions, or mental processes that result in knowledge and understanding, are viewed as a fundamental basis for behavior. A cognitive hierarchy model relating values, attitudes, and behaviors forms the basis of much research on human-environment interactions (Homer & Kahle, 1988). Emotional processes and place-based attachments, however, are also considered important determinants of pro-environmental behavior (Stedman, 2002; Jacobs, 2012; Gifford & Nilsson, 2014).

The interaction of cognitions, emotions, and behavior are complex. Behavioral theories such as the theory of planned behavior (TPB) (Ajzen & Fishbein, 1980; Ajzen, 1991) and value-belief-norm (VBN) theory (Stern, 2000) contribute to empirical understanding of the relationships between cognitive processes and resulting behavior in environmental contexts. TPB and VBN are complimentary constructs for explaining a wide range of environmentally significant behavior with a few key differences (Kaiser et al., 2005). TPB was developed from the prior theory of reasoned action (Fishbein & Ajzen, 2011), a “rational choice” perspective on behavior that considers attitudes, perceived behavioral control, and behavioral intentions as the proximate antecedents of behavior (Conner, 2020). TPB has been utilized in diverse research contexts, including leisure choice (Ajzen & Driver, 1992), hunting and outdoor recreation (Rossi & Armstrong, 1999; Hrubes et al., 2001; Daigle et al., 2002), technology use (Schwab et al., 2020), health and nutrition (Conner et al., 2002), and ethics (Beck & Ajzen, 1991).

The VBN perspective on behavior incorporates the influence of moral and normative factors (Stern, 2000), and is derived from previous theorizing on the nature of values and the role of norms in structuring altruistic behavior (Schwartz, 1977). A “social dilemma” emerges when one’s self-interest and the interests of others conflict, which is often the case when considering

personal behavior changes that might positively affect the environment (Kaiser et al., 2005). A well-known social dilemma is Hardin's (1968) "tragedy of the commons." Moral considerations become salient in such dilemmas to resolve the dissonance between self and collective interests. According to the VBN theory, constructs that influence behavior include underlying values, a sense of moral obligation to act, and a belief that one's actions will affect the outcome of interest (i.e., efficacy) (Stern et al., 1999).

Additionally, social identity theory (SIT) (Tajfel & Turner, 1986; Hogg, 2020) provides an additional cognitive and normative basis for exploring stakeholder values and attitudes toward wildlife management and conservation (Lute & Gore, 2014; Schroeder et al., 2021). Social identity theory describes the affiliation of one's identity with desirable groups which leads to behavior that is congruent with group norms (Turner & Onorato, 1999). According to a process of self-categorization, individuals come to identify with other individuals with similar values through a recruitment process that is a result of individual motivations and group-level socialization (Enck, 2013). SIT is a valuable framework for exploring behavior in environmental arenas that results from diverging values and ideologies between groups or convergent characteristics within groups (Lute & Gore, 2014; Colvin et al., 2015; Bruskotter et al., 2019).

More specifically, I propose to assess nature-based recreationist stakeholders regarding their values, motivations, behaviors, and other socio-demographic characteristics. Pro-environmental behaviors, or "actions that generate positive environmental impacts, promote environmental quality, and result in sustainable use of natural resources" (Cooper et al., 2015:446) are conceptualized in my study as an outcome, or dependent variable. Social psychological and demographic attributes of nature-based recreationists might influence the frequency with which they engage in pro-environmental behaviors. Values underpin higher order

cognitions and orient the patterns and directions of individual beliefs about relationships between humans and wildlife (Fulton et al., 1996). Motivations refer to the anticipated psychological, social, or physical benefits obtained through participation in nature-based recreation (Manfredo et al., 1996). Additionally, normative influences potentially interact with aspects of affective place-based attachments and specialization to affect stewardship engagement (Bricker & Kerstetter, 2000; Jacobs, 2012).

Dissertation methods

I employed a mixed methods research approach that used in-depth interviews and a web-based questionnaire (Creswell & Clark, 2017). Qualitative, and more specifically, phenomenological studies enable in-depth information on a topic from an insider's point of view that provides descriptive knowledge, meaning, and nuance to the topic of interest. A secondary purpose of qualitative inquiry is to reveal patterns in responses that suggest hypotheses to be tested through quantitative means (Jick, 1979). Quantitative approaches build on the rich knowledge gained from phenomenological research to quantify relationships that can be generalized across different contexts through statistical inference, probability, and significance testing (Fielding & Gilbert, 2006).

Qualitative data were collected through in-depth interviews (Rubin & Rubin, 2012) with birdwatchers (n=15) and mountain bikers (n=15) in March - July 2019. In-depth interviews enabled understanding the birdwatching and mountain biking experience from an "insider's perspective" and facilitated the development of integrative insights revealed through the stories of key informants (Miles & Huberman, 1994). Quantitative data were collected in June-July 2020 through a Qualtrics web-based questionnaire (n=19,143) distributed to e-mail addresses in the MDNR's GovDelivery e-mail database. A quantitative approach allowed me to test and

confirm relationships between variables identified in the qualitative phase and identify key variables of interest among a broader population (Creswell, 2017).

My research is rooted in a post-positivist paradigm that recognizes that knowledge is socially constructed (Guba & Lincoln, 1994) and that methodologies most applicable to the problem at hand depend largely on the specific research questions and objectives (Clark, 1998). This epistemological orientation grounds my approach to data collection through all phases of research by balancing the use of theory and empiricism with the understanding that in practice science is a value-laden enterprise. Pragmatic approaches to scientific inquiry in the social sciences that lead to practical benefits to society often incorporate different epistemological traditions, and I believe this is the best path to achieving research objectives and respecting the voices and lived experiences of the people being studied.

Full data collection instruments (interview guide and questionnaire) are available in Appendices B and C. All data collection was conducted in compliance with Michigan State University's Institutional Review Board (IRB) and Human Research Protection Program (HRPP) by ensuring confidentiality of interview and survey respondents and obtaining informed consent from all participants (IRB STUDY00001445; available in Appendix A). This research was made possible through Michigan State University's Partnership for Ecosystem Research and Management. Primary funds were provided by the MDNR Wildlife Division through grant no. WLD1506. Supplementary funding was generously provided through scholarships and awards from the Safari Club International – Michigan Involvement Committee, and the Rural Sociological Society.

Dissertation organization

My dissertation is organized into five chapters. Three chapters (2-4) were formatted for publication and have been or will be submitted to peer-reviewed journals. Chapter 1 provides an introduction and outlines objectives and conceptual background to orient the reader; the results of a qualitative research phase are reported in Chapter 2 in which I compare the experiences, motivations, and meanings of birdwatching and mountain biking for Michigan recreationists. Phase one analysis contributed to the completion of objectives one and four. Chapters 3 and 4 represent a quantitative research phase and report findings related to hunters' and wildlife watchers' support for alternative conservation funding strategies, and engagement in pro-environmental behaviors by nature-based recreationalists. Phase 2 analysis contributed to the completion of objectives two, three, and four. Chapter 5 offers a synthesis of findings, contributions to theory and practice, limitations, and suggestions for future research.

CHAPTER 2: MOTIVATIONS AND MEANINGS: COMPARING MICHIGAN BIRDWATCHERS AND MOUNTAIN BIKERS

Abstract

The processes and contexts through which recreationists create meaning from their experiences in nature are not well understood. The aim of this qualitative investigation was to explore the experiences, motivations, and meanings associated with nature-based recreation for Michigan birdwatchers and mountain bikers. In-depth interviews with 30 participants suggested general and activity-specific motivational frames through which birdwatchers and mountain bikers interpret their experiences. Through emotional processing and experiential feedbacks, they developed relationships with people and places, leading to long-term benefits and meaningful connections. I used a phenomenological approach to explore the motivations for birdwatching and mountain biking and identify higher-order meanings related to their self-identity. Primary intrinsic motivations included *relaxation, escape/solitude, enjoying nature, discovery/novelty, fitness/health, and overcoming challenges*; place-based motivations included *setting/aesthetics, access, local knowledge, and trail characteristics/sustainable development*; formation of an identity involved with nature-based activities resulted from *childhood experiences in nature, family functioning, social connection, mentorship, group membership, and stewardship/conservation involvement*. Understanding the experiences, motivations, and higher order meanings of birdwatching and mountain biking helps public lands managers and recreation planners to provide meaningful experiences that meet the interests and expectations of participants in increasingly popular recreational activities on public lands.

Introduction

Nature-based outdoor recreation provides individuals and society with many social, psychological, and physical benefits (Kellert, 1985; Cordell et al., 2002; Louv, 2008). One way

to understand the desires and benefits recreationists seek is by examining their motivations for participation in leisure activities (Beard & Ragheb, 1983). Since outdoor recreation is one of myriad ways in which people interact with the natural environment, understanding the motivating forces behind recreationist choices can help public lands managers and planners to meet the needs of stakeholders, predict future recreation demands, and maintain support for continued public lands protection and management (Weiler et al., 2013).

Emotional, physical, and social needs push recreationists into nature to achieve certain goal states (Ajzen, 1991; Driver, 2008) and pull them towards various destinations in which to actualize those outcomes (Klenosky, 2002). An emergent approach, however, is increasingly being used in conjunction with motivations to explain how meaning emerges from recreational experiences through interactions with the natural environment (Patterson et al., 1998; Fix et al., 2018). Push and pull factors work together to motivate people to seek experiences, shape expectations, and develop mental models of nature-based experiences that lead to emergent meanings (Patterson et al., 1998; Goossens, 2000). Moreover, an emergent approach considers how motivations interact with the affective and symbolic meanings of recreational settings, leading to a richer understanding of the ways individuals develop relationships with the activity and the place in which it occurs (Brooks et al., 2006).

Two forms of nature-based outdoor recreation, birdwatching and mountain biking, have been increasing in popularity (Cordell, 2012). Birdwatching has been among the fastest growing recreational activities in terms of total participants and activity days (Cordell & Herbert, 2002; USFWS, 2018). Birdwatchers are an important group of wildlife-associated recreationists who hold a high level of knowledge about wildlife in general (Kellert, 1985). Conversely, mountain biking is a relatively new form of adventure recreation that emerged in the 1970s and has

become popular in a variety of settings (Leberman & Mason, 2000). Mountain bikers and other recreationists (e.g., hikers, birdwatchers) often rely on similar trail-based contexts (e.g., multi-use national forests trails) where conflicting goals and participation styles can lead to actual or perceived conflict with other user groups (Ramthun, 1995; Carothers et al., 2001; Vaske et al., 2004; Tumes, 2007).

Motivations for leisure activities have been studied quantitatively, but there is a dearth of qualitative inquiries into birdwatching and mountain biking, and no studies directly compare and contrast the experiences and meanings associated with both activities. A deeper understanding of the quality and characteristics of recreational experiences may help public lands managers mitigate the negative effects associated with increasing demands of recreational users and conflicts between user groups (Vaske & Donnelly, 2002; Taylor & Knight, 2003; Rupf et al., 2014). Additionally, users of public lands may be an important component of conservation and environmental protection strategies as experiences in nature have been shown to increase willingness to support conservation (Zaradic et al., 2009).

Drawing on conceptual backgrounds from Dann's 1977 theory of "push and pull" motivations, social identity theory (Stets & Burke, 2000), and hermeneutics (Patterson et al., 1998), I explored the various intrinsic, place-based, and social factors that influence participation and the subsequent development of meaningful experiences through nature-based recreation, specifically comparing the perspectives of birdwatchers and mountain bikers. This study contributes to a richer understanding of nature-based recreationists and interconnections between motivations, the meanings attached to recreational experiences, and the setting in which it occurs. The aims of this study were to: 1) explore the factors that influence participation in mountain biking and birdwatching and lead to meaningful experiences, 2) explore place-based

characteristics that affect the quality of experiences, 3) examine perspectives of recreationists on environmental management and conservation issues, and 4) develop a qualitative conceptual framework to integrate motivations and meanings associated with nature-based experiences that can aid in the development of experiential benefits-based typologies for managers.

Background

Given the changing social and environmental contexts for nature-based recreation in the 21st century, it is more important than ever to understand the basis of human-nature interactions and the factors that drive outdoor recreationists to engage in outdoor activities. People seek leisure experiences for a variety of reasons based on benefits they receive, such as increased well-being and resistance to stress (Denovan & Macaskill, 2017). Nature-based outdoor recreation is a form of leisure through which people seek outdoor experiences to obtain leisure benefits (Manfredo et al., 1983). Motivations for participation in nature-based recreation can be directly related to the activity (intrinsic) or external to the activity (extrinsic), highly contextual, and change over time in response to changing social or personal norms (Ryan & Deci, 2000).

Motivations for pursuing leisure activities have been studied from multiple perspectives (Dillard & Bates, 2011). In the context of nature-based outdoor recreation, outcomes-focused approaches have been used to provide recreation managers and planners with information regarding the benefits sought and satisfaction of recreational users (Manfredo et al., 1983, 1996). Outcomes-focused management emphasizes the social, cognitive, and physical benefits people seek through participation in nature-based activities (Driver, 2008). For instance, the Recreation Opportunity Spectrum (ROS) (Clark & Stankey, 1979) and Recreation Experience Preference (REP) scales (Manfredo et al., 1983) were developed to provide public lands managers with information about the kinds of experiences recreationists seek, benefits they receive from those

experiences, and qualities of the settings in which they recreate that lead to greater satisfaction with experiences (Hendee et al., 1971). Manfredo and colleagues (1996) analyzed studies that used REP scales and found that factors related to escape, achievement, autonomy, nature, and fitness are common motivations for outdoor recreationists.

Outcomes-based approaches can be organized broadly under Dann's 1977 theory of "push and pull" motivations (Dann, 1977; Baloglu & Uysal, 1996). The theory has been used broadly to explain the goals and desires that push individuals to seek benefits through leisure activities, recreation, or tourism, and pull them toward certain settings or destinations in which they can actualize their desired outcomes (Klenosky, 2002). Push and pull theory improves on previous heuristics that tend to emphasize push motivations (i.e. goals/benefits) but do not always consider the influence of setting characteristics in determining the quality of the experience (Patterson et al., 1998). The push and pull theory of motivations inherently incorporates aspects of experience-based benefits that recreationists seek as the logical antecedent of place-specific motivations that pull recreationists to particular destinations (Klenosky, 2002). In that sense, qualities of "place" are integral to nature-based recreation and the meanings that participants construct through interactions with social, physical, and symbolic aspects of nature-based experiences (Brooks et al., 2006; Fix et al., 2018).

Birdwatching and mountain biking are two popular nature-based recreational activities whose participants are motivated by a broad range of push and pull factors. Birdwatching, identified as "the act of observing and identifying wild birds" (Watson, 2016) has steadily increased since the 1980s (Cordell & Herbert, 2002; USFWS, 2018) and is projected to continue increasing in popularity (Cordell, 2012). The motivations and socio-demographic profiles of birders have been the subject of prior investigation; Committed and casual birdwatchers are

drawn to the aesthetic and ecological qualities of birds, and committed birders hold a high level of general knowledge about wildlife (Kellert, 1985). On average, committed or competitive birders tend to be male (Kellert, 1985; Scott et al., 1999), while casual birders tend to be female (McFarlane & Boxall, 1996). Birders are also more frequently in older age and higher educated demographics (Cole & Scott, 1999). Birding is “a practice that is deeply embedded in the living world around it” and watching birds is “a method of acquiring natural history knowledge” (Watson, 2016; pg. 115), and as such, birdwatchers are presumed to hold strong connections to nature and wildlife due to their close contact with natural settings and observations of bird behavior.

Mountain biking is typically classified as an adventure sport, commonly listed alongside other thrill-seeking activities such as mountaineering, downhill skiing, surfing, kayaking, and hang gliding (Weber, 2001; Kerr & Houge Mackenzie, 2012). Mountain bikers, however, often use trail-based settings in multiple use environments (outside of purpose-built facilities) where they encounter and interact with other user groups (e.g., hikers, runners, birdwatchers, hunters, etc.) (Rossi et al., 2012). Primary motives for participation in mountain biking are commonly found to be related to physical fitness (Hollenhorst et al., 1995), challenge (Getz & McConnell, 2014), and social interaction (Taylor, 2010). However, mountain bikers in Norway rated physical exercise followed by “nature and place” as the two primary motivations for participation, suggesting that specific site qualities and nature-based settings are highly important (Skår et al., 2008). Mountain bikers who use national forest trails were motivated by an enjoyment of nature and were far more likely than other national forest users to engage in formal, organized social activities, indicating strong attachment to both the recreational setting and the mountain biking community (Hollenhorst et al., 1995). Emerging evidence suggests that mountain bikers are a

heterogeneous group who value natural environments and resource protection (Taylor, 2010; Reiter & Blahna, 2012) and are motivated by experiencing nature (Rupf et al., 2014). In-depth, qualitative investigations of mountain bikers are sparse, with very few studies proposing to address the meaning of mountain biking experiences and views on environmental conservation.

Birdwatchers and mountain bikers represent two groups of important stakeholders for recreation planners and managers because they often use similar settings (such as national forest trails), leading to potential interactions and conflicting goals (Ramthun, 1995; Tumes, 2007). Moreover, recreationists who depend upon natural settings to engage in recreation have been hypothesized to hold environmentally friendly attitudes at higher rates than the general public, making them potential allies in supporting management and conservation efforts to protect habitat and minimize negative environmental impacts (Dunlap & Heffernan, 1975). Evidence to support the presumption of a relationship has been varied, however, leading to extensive theorizing about the nature of relationships between nature-based recreational motivations and conservation attitudes and behaviors (Theodori et al., 1998; Teisl & O'Brien, 2003; Lee, 2011; Larson et al., 2018).

The economic and political impact of the birdwatching clientele potentially represents a significant contribution to conservation through voluntary monetary donations to conservation organizations, social support through group membership and citizen science initiatives, and ecological support through wildlife habitat improvement (Wiedner & Kerlinger, 1990; McFarlane, 1994). Glowinski and Moore (2014) found that birdwatchers who were motivated by conservation-related factors expressed greater environmental concern, but birding participation itself was unrelated to conservation motivations. Greater engagement in conservation activities has been observed among more specialized birdwatchers, however, indicating that participation

is related to conservation involvement (McFarlane & Boxall, 1996; Hvenegaard, 2002; Cooper et al., 2015). The motivations of birdwatchers might shift over time as they gain skill and experience, with advanced birders more likely to contribute to conservation causes (McFarlane & Boxall, 1996; Scott et al., 1999), but novice birders were more likely than advanced birders to rate conservation as their primary motivation for participating (McFarlane, 1994). While birders have been the subject of attention from wildlife and conservation advocates, involvement in conservation activities among mountain bikers has not been well documented.

Other factors may contribute to motivations for nature-based experiences among birdwatchers and mountain bikers. A key concept related to nature-based recreation motivations are the meanings recreationists attach to their experience (Williams et al., 1992; Patterson et al., 1998; Brooks et al., 2006; Fix et al., 2018). Williams et al. (1992) argued that the prevailing approach to recreation management focusing primarily on outcomes (e.g., REP scales) reduces the recreational setting to a commodity that can be engineered to provide specific experiences for different types of stakeholders; a view that may have limited utility for managers if it is not paired with additional information. Emergent aspects of recreational experiences may be important factors in determining user satisfaction and willingness to engage in environmental stewardship behaviors (Bright & Porter, 2001; Halpenny, 2010). Meaningful experiences are facilitated by emotional connection to the environment and other people, as well as time spent processing experiences and integrating them into daily life (McIntosh & Wright, 2017). Further, there is evidence that recreation participation more frequently leads to engagement in environmentally friendly behaviors when the participants spend time reflecting on the meaning of nature experiences (Høyem, 2020). An exploration of the meanings and processes that

contribute to meaningful experiences in nature allows researchers to go beyond identifying push and pull motivations, which may have different meanings for different people.

Nature is inherently unpredictable, and participation in dynamic recreational activities in nature often results in unanticipated or unexpected events that may bear just as heavily on the quality of the experience as the goals that initially motivated participation (Williams et al., 1992; Fix et al., 2018). Satisfaction with the recreational experience then might not be a linear sequence of events that are judged by cognitively comparing expectations and outcomes but rather the result of emergent qualities that are context-specific and result from novel experiences that accumulate meaning over time. This hermeneutic approach to motivations and emergent meanings is based in a normative research paradigm that acknowledges that emergent properties of human experience are co-produced through dynamic interactions with the surrounding environment (Patterson, 1998). The novel and unexpected outcomes contribute to deeper meanings that enrich the participants' lives as they reconstruct memories of the experience over time (McIntosh & Wright, 2017).

Qualitative approaches are well suited to investigations of motivations and emergent properties of nature-based experiences because they allow the participants themselves to explain *why* certain motivations are important, and what nature-based experiences mean to them. The present study attempts to integrate push and pull motivational factors with emergent meanings of experiences in nature into a qualitative conceptual framework through in-depth interviews with birdwatchers and mountain bikers.

Methods

I used a phenomenological approach based in a constructivist epistemology (Guba & Lincoln, 1994) to conduct in-depth interviews that examined the emergent meanings and

motivations associated with birdwatching and mountain biking in Michigan. Phenomenological research focuses on the lived personal experiences and stories of research subjects (Bryman, 2016). My role as a researcher was to facilitate open discussion and ask probing questions for clarity. Participants were not, however, asked a standard list of predetermined questions, and the interviewee is free to direct the conversation to topics not introduced by the researcher.

Data collection for this study was guided by several research questions with an overarching objective of obtaining a rich understanding of the birdwatching and mountain biking experience:

1. What push and pull factors motivate birdwatchers and mountain bikers to seek nature-based experiences?
2. How does participation in nature-based recreation fit into the broader context of participants' lives?
3. How do participants create meaning from nature-based experiences?
4. Do birdwatchers and mountain bikers differ on key motivations, meanings, or perspectives on nature and environmental conservation, and if so, why?

Sampling and data collection

Data collection occurred in March through July 2019 at various locations in the state of Michigan. Thirty interviews were conducted with mountain bikers (n=15) and birdwatchers (n=15) at several locations across the state (Figure 2.1). A combination of purposive and snowball sampling methods (Patton, 2015) were used to recruit participants for interviews. Sampling was not random; I aimed to capture geographic and demographic variation to represent a range of recreational habits, lifestyles, backgrounds, and perspectives. My primary concern was sampling for a diversity of perspectives rather than representativeness or generalizability.

Participants were informally recruited through communications with birding and mountain biking organizations, bike shops, and social media groups. Criteria for inclusion were respondents be over the age of 18, a Michigan resident, and self-identify as either a mountain biker¹ or birdwatcher (regardless of frequency of participation). Candidates were e-mailed an invitation along with a brief description of the study; those who responded were scheduled for an interview. Those who did not respond were contacted with a follow-up e-mail after one week, and if no response was received, they were excluded from the study. Interviews concluded with asking respondents for further recommendations for potential interviewees involved with mountain biking or birdwatching, a strategy known as snowball sampling (Heckathorn, 2011).

Interviews were conducted in person at locations chosen by the interviewees, such as coffee shops, restaurants, or public libraries. Several of the interviews were conducted in the participants' homes at their request. I interviewed 11 females and 19 males ranging in age from early 20's to mid-80's residing in various regions of the state (Table 2.1). Interviews averaged 46 minutes in length and were audio recorded on-site with permission and later transcribed verbatim to ensure accurate representation of participant statements. Interviewees were assigned a pseudonym before interviews began to maintain confidentiality. All attempts were made to accommodate the interviewees' schedules and to conduct interviews in a quiet, comfortable setting conducive to productive conversation. I treated each interview as a loosely guided conversation and used an interview guide to provide structure and topical relevance. The interview guide (available in Appendix B) contained several main topic questions as well as potential follow-up questions and probes for further detail and clarity in anticipation of a range

¹ Interviews focused solely on recreational mountain biking, as opposed to professional or team-based racing, or road cycling. Some participants were involved in multiple types of cycling, however, I specified I was interested only in mountain biking as a recreational or leisure activity for the purposes of this study.

of possible responses (Rubin and Rubin 2012). Topics for main questions were pathways of initiation into nature-based recreation (either birdwatching or mountain biking), generalized experiences in nature, socialization within the outdoor recreation community, membership and activity in outdoor recreation clubs or organizations, and perspectives on public lands management, wildlife management, and conservation. Interview guides were identical for both types of recreationists with minor semantic changes based on whether the respondent was a birdwatcher or mountain biker. All interview protocols were approved by Michigan State University's Institutional Review Board, (STUDY00001445; available in Appendix A).



Figure 2.1: Recreationist interview locations in Michigan.

Table 2.1: Demographic characteristics of interview participants.

Characteristic	Number of Interviewees
Recreation Type	
Birdwatcher	15
Mountain Biker	15
Sex	
Female	11
Male	19
Age Group	
18-34	7
35-49	10
50-64	9
65+	4
Region of Residence	
Southern Lower Peninsula	13
Northern Lower Peninsula	11
Upper Peninsula	6

Data analysis

Data were transcribed verbatim using Rev transcription service and imported into NVivo 12 qualitative software package for analysis (QSR International Pty Ltd., 2018). An inductive process (i.e., Grounded Theory; Strauss & Corbin, 1997) grounded conclusions in the interview data rather than testing existing theory² or *a priori* hypotheses, with the goal of achieving an understanding of birdwatching and mountain biking experiences and associated motivations and meanings. Open coding of data resulted in development of an initial codebook identifying the themes and concepts from the interview transcripts most relevant to the study's research questions (Table 2.2). An iterative process of code refinement and comparative nomothetic analysis was used to organize and interpret the data (Saldaña, 2015). Reliability and validity

² Behavioral social science theories, such as hermeneutics (Patterson et al., 1998) and social identity theory (Hogg, 2020; Tajfel et al., 1979), provided conceptual guidance in designing the study. Since no theory was explicitly tested, however, the study remains inductive in nature within a grounded theory framework (Strauss & Corbin, 1997).

were sought through multiple rounds of coding, critical analysis, reflection, and multiple inter-coder agreement (Drost, 2011).

Table 2.2: Codebook of conceptual categories identified through analysis of interviews.

Code	Sub-code	Definition
BARRIERS	Structural Personal Interpersonal Financial	Barriers to participation in outdoor rec – could potentially stem from structural or organizational barriers (lack of access, unclear regulations, safety concerns, etc.), financial barriers (equipment expenses, travel costs, etc.), personal barriers (lack of time, family obligations, etc.), or interpersonal barriers (lack of mentorship).
CHILDHOOD		Respondent mentions childhood experiences in nature as an important component of current or past outdoor recreation participation.
COMMUNITY	Physical Virtual	Respondent cites aspects of outdoor rec participation that shows the importance of communal or social organization. They identify as a part of a recreational community. Can be physical (rooted in a geographic location) or virtual (e.g. belonging to a Facebook group).
CONFLICT	Intergroup Intragroup Interpersonal	Respondent cites or infers conflict or perceived conflict between user groups, within groups, between groups and individuals, or between individuals in an outdoor recreation context. Alternatively, respondent mentions strategies to help mitigate conflict (i.e. using trail east/west for hiking, west/east for biking).
CONSERVATION		Respondent mentions or refers to conservation of the natural environment in any capacity – natural area/public lands, wildlife, habitat, or other environmental conservation; carried out through governmental agencies, private organizations, or individuals. Respondent provides their definition of “conservation” or refers to themselves as a “conservationist”.
DEMOGRAPHICS	Age Sex Ethnicity Cohort	Respondent cites demographics of an organization or participants in outdoor rec activity or indicates that demographics are changing. Might include broader generational changes, or ethnicity, age, or sex of participants, or respondent cites organizational efforts to become more inclusive or broaden appeal of outdoor rec to different demographics.
ECONOMICS	Financial contributions Local business Funding Cost Tourism	Respondent refers to economic issues, such as contributing financially to a relevant organization or paying membership dues; supporting local business through recreation tourism; funding for relevant initiatives (trail development, land acquisition, educational programs, etc.); cost associated with outdoor recreation (travel, equipment, etc.)
EDUCATION		Respondent mentions educational initiatives to connect individuals or groups (i.e. youth) to specific outdoor activities or indicates the value of such efforts.
IDENTITY		Respondent makes a statement that indicates the centrality of the subject to their identity.
IMPACTS	Perceived Social Environmental Economic	Impacts related to outdoor recreation are mentioned – might be perceived impacts (i.e. perception of risk) or fall under social or environmental impacts. Economic impacts include tourist or recreational activities that affect local businesses.
LIFESTYLE		Participation in activity is central to respondent’s lifestyle.

Table 2.2 (cont'd)

MANAGEMENT	Access Policy/regulations Agency culture Sustainability Habitat Organism	Respondent mentions management activities or issues related to policies or regulations, state or federal government natural resource agencies, culture of state or federal natural resource agencies, sustainable development of trails and/or public land, or management of habitats or organisms.
MOTIVATION	Intrinsic Social Place	Motivations for participation in outdoor rec – Falls into two broad categories: intrinsic (internal, i.e. personal satisfaction, accomplishment, goal seeking, enjoying time in nature, etc.) and extrinsic or social (external, i.e. event deadlines, spending time with family/friends, etc.) motivations.
NORMS	Personal Group Social	Respondent refers to formal or informal social norms that govern behavior related to outdoor recreation. Can be personal norms (desire to engage in private environmental behaviors) or group norms (social pressure to act in a certain way).
ORG	Public Private	Respondent mentions belonging to or being involved with an organization or club related to outdoor recreation, conservation, wildlife, environmental issues, etc.
PARTNERSHIPS	Partnerships Friendships Mentorships Relationships	Respondent mentions the importance of social relationships in shaping their outdoor rec participation or attitudes and values related to outdoor rec, conservation, environmentalism, etc. Examples might illustrate the importance of partnerships between organizations or individuals, friendships, or mentors.
TECHNOLOGY		Respondent cites use of technology as an important factor for outdoor recreation participation (i.e. eBird, Facebook groups, etc.)
VOLUNTEER		Respondent reports past involvement, current involvement, or future intentions to participate in volunteer initiatives related to outdoor recreation, outdoor events, citizen science, natural area management, or habitat improvement on public or private land.
WILDLIFE		Respondent mentions wildlife or indicates the importance (or lack of importance) of wildlife as it pertains their outdoor rec participation. (For birders, only code if they mention non-target wildlife not related to bird watching).

Results and Discussion

The “push” motivations identified through my interviews were described through several interpretive frames: *relaxation*, *escape/solitude*, *overcoming challenges*, *fitness/health*, *discovery*, and *nature enjoyment*. The “pull” motivations and place-based factors influencing the quality of recreational experiences were also identified: *setting*, *access*, *local knowledge*, *trails/infrastructure*, *community*, *environmental impacts*, and *economic impacts*. Finally, I examined broader, emergent meanings of recreational experiences that are connected to the development of respondents’ *identity* as a birdwatcher or mountain biker. This refers to the

processes through which one comes to identify as a group member and the stories people tell themselves and others about who they are, what's important to them, and what it means to be involved with birding or mountain biking communities (Enck, 2013). Themes that emerged to affirm or reaffirm a sense of identity were *childhood experiences*, *sharing skills and knowledge*, *family functioning*, and *stewardship/environmental ethics*. Together, these themes and concepts indicate the importance of higher-order meanings, utilizing nature-based experiences to achieve a **connection** to *oneself*, to *nature*, and to *each other* (Figure 2.2).

Intrinsic motivations for birdwatching and mountain biking

Early in interviews, respondents often struggled to put their experiences into words. Many people do not think about the reasons *why* they participate in nature-based recreation, but they intuitively understand that it provides certain benefits. Engaging in leisure activities such as nature-based recreation provides a buffer against stress and provides a healthy coping mechanism that helps deal with everyday pressures (Denovan & Macaskill, 2017). My respondents indicated that experiences in nature provide a sense of *relaxation*. Mark J., a birdwatcher from mid-Michigan, put it simply: "There is a lot to be said just for taking a walk in the woods. Just, it's relaxing." This feeling was echoed by Amanda H., another birdwatcher from the Detroit area: "It's relaxing and I just feel like I can kind of zone out. I don't think about too many other things. I find it very relaxing in a way that not many things relax me."

In describing what drew Amanda to birdwatching, she stated that she was able to achieve a relaxed mindset that was not always accessible at other times in her daily life: "I found it very relaxing and very almost meditative in a way that, you know, I'm not like a yoga person or anything like that, so it was nice." Although Mark was relaxed by simply "taking a walk in the woods," Amanda felt relaxed by being fully immersed in the birdwatching experience. Sean W.

viewed watching birds as an antidote to a particularly stressful day: “When I’ve had a rough day or whatever, just go on a hike at Stony [Stony Creek Metropark] real quick and it’s like there’s nobody out there, it’s just me, the birds, plants, wind... super relaxing.”

Interviewees often indicated that an *escape* to natural settings or experiencing *solitude* in nature are key factors that led to a relaxed or refreshed state of mind. Eric H., a mountain biker from Marquette, enjoyed the “peace and solitude” that mountain biking provides as an escape from his daily job working at a prison where “everything is so loud and negative all the time.” Pete D., another mountain biker from the upper peninsula, found that mountain biking provides an escape from the constant distractions of technology and life’s everyday minutiae: “Just being out in nature and away from people, society, and just being able to kind of turn off the brain and not be distracted by anything... just being able to enjoy not having to think.” Mark J. found a similar escape and disconnection from technology through birdwatching: “It’s really nice just to feel disconnected. The only thing that has me connected to the real world is just the phone in my pocket, that I can leave in the car if I wanted to.” The distinction Mark drew between time spent in nature and the “real world” indicated a feeling of disconnection from nature in everyday activities that can be remedied by escaping one’s ordinary routine by engaging in birdwatching.

The concept of *escape* was often paired with themes related to *solitude* and *disconnection*, pointing to the importance of “unplugged” experiences in nature. Electronic devices and “videophilia” often compete for time with outdoor activities, and some attribute a growing disconnection from nature to the rapid proliferation of technology and media, especially among youth (Louv, 2008). The opportunities to eliminate distractions commonly found in day-to-day activities (e.g., mobile phones, tablets, and other portable technology) during recreation seemed to be an essential component experiences that enriched and recharged the lives of

respondents I spoke with. Pete D., a mountain biker from the upper peninsula, expressed that biking is a way to disconnect and calm his mind:

It's a good way to kind of disconnect from my thoughts, because you know I'm one of those people who has a mind that's everywhere at once. And when you're mountain biking you've got to be pretty focused on the task at hand. So it's a good way to just unplug from all that.

Pete's comments suggested a prominent role of flow states, or "a merging of action and awareness" (Lamont & Kennelly, 2012, pg. 241). Flow states are characterized by intense focus and absorption in an activity, losing a sense of time, and a feeling of being "in the moment" (Csikszentmihalyi, 2000). Flow states become intrinsically rewarding and motivate further participation as participants overcome challenges and improve their skills (Lamont & Kennelly, 2012). *Flow* was not an active motivation that interviewees were consciously aware of and seeking, but it was a common thread that became apparent as many described their experiences. This is related to the motivation *overcoming challenges* as participants improve their skills and seek increasingly difficult goals to match their new found competency (Taylor, 2010). Kat M. described the intrinsic rewards of the *challenge* presented by mountain biking as a "high", providing motivation to continue setting goals for oneself throughout life:

I think as you get older, there's not a lot of challenges anymore unless you do it for yourself. You go through school, that's a challenge. You start a family, that's a challenge. You get married. But then all that kinda wears off and there's not a lot as you get older that gives you that high anymore.

The topic of *overcoming challenges* was raised by both birdwatchers and mountain bikers. Striving to improve oneself and develop self-efficacy can lead to a sense of control over

one's life that provides greater confidence and improved mental well-being (Bandura, 1977). The psychological and physical benefits mountain bikers gained from overcoming new obstacles, more challenging terrain, and longer rides resulted in feelings of competence and self-esteem (Ewert et al., 2013). For birdwatchers, the satisfaction of identifying a new or rare species, along with competitive aspects of species listing, provided a similar thrill. "I'm really into rare birds and chasing them around the state and building my state list and stuff" (Sean W.) Sean talked about his competitive nature and the ease with which the social media app "eBird" (Wood et al., 2011) enabled him to track his ranking in the county or state over time: "I like being number one. But it's a friendly competition. There's no prizes, there's no award or anything, it's just bragging rights." As Sean exemplifies, it was more common for birders interested in rare birds and competitive listing to be willing to travel great distances for the sole purpose of birdwatching. Additionally, while not all were competitive, most birders kept a list of species which is indicative of intermediate or advanced levels of birdwatching (McFarlane & Boxall, 1996).

Mountain bikers frequently cited improved *health and fitness* as a primary motivation for participating. Mountain bikers often found that biking feeds into their desire to improve themselves and their performance, improve their health, build strength and resiliency, and develop a healthy lifestyle. Motivations for recreation often change as a function of age with health-related motivations emerging as people get older (Goodsell et al., 2013). Jenna H. and Jeff R. both pointed to mountain biking as a way to stay in shape as they approach what they perceive as "middle aged": "But once I started this sport, I realized that it was the best sport for my age group. I'm feeling a lot of twinges and stuff and mountain biking is a really good cardio workout" (Jenna). According to Jeff: "I kind of wanted to get a little more serious, find something to start losing some weight, because I'm getting a little heavier, so I wanted to lose

weight, and just did not like to run.” Jeremy W., a leader in the Michigan mountain biking community, pointed out the beneficial effects of biking on health and well-being in youth:

I think mountain bikers, in the sport, you get those who, it's recreational, they love nature, they love what it gives them in terms of being out with nature. But they also want to improve themselves from a personal, physical fitness standpoint. And also, with our society being largely sedentary and obese, getting especially kids out, away from the screen time and stuff, and onto bikes, and getting healthy habits, exercise, that they can also enjoy.

Experiences in nature often provided the opportunity for recreationists to see, experience, or *discover* something new. Novelty can provide a break from monotonous daily routines (Bello & Etzel, 1985), which appealed to birdwatchers and mountain bikers. “I’m still in the process of learning, so it’s a sense of a possibility I’ll see something I haven’t seen before.” (Mark J., birdwatcher). The thrill of seeing a new species or discovering a new trail imparted a sense of wonder and curiosity about what they will find next. Amanda H. expressed an enjoyment of the scientific nature of birdwatching: “I do enjoy sort of the investigative nature of it, like trying to find something and learn the patterns of the birds and how they operate.” Leah J. found that birding appeals to her curiosity and scientific nature and propels her to go beyond the experience and learn more about what she sees: “I really liked knowing more about what I was seeing. It went with the binoculars and the bird book, that it wasn’t just that birds were around me, it’s that I knew something about them. I still love that part.” Mark P. described his reasons for enjoyment of birding: “And it was the beauty of the birds, the beauty of the environment, the beauty of the habitats, as well as the scientific intrigue of specific questions.”

As our conversations progressed during the interviews, it was common for respondents to gradually shift their focus from the benefits obtained from a specific type of nature-based recreation and talk more about the general benefits provided by *spending time in nature*. Indeed, the vast majority of respondents participated in several outdoor activities, of which birdwatching or mountain biking were just one. Although they identified themselves as birdwatchers or mountain bikers, they often took pride in being “outdoors enthusiasts” who enjoy a broad range of nature-based activities. Bob D., a mountain biker from Big Rapids, spoke of participation in a range of nature-based activities in addition to mountain biking, and indicated that his bar for “success” tends to be generalized experiences rather than narrow outcomes from specific activities. Similarly, although Derek W. from Traverse City is a prominent member of the mountain biking community, he said “I hunt, fish, swim, hike, snowmobile, dirt bike, along with mountain biking. I try to embrace it all. I’m an outdoors person.”

Past investigations have found that it is common for mountain bikers to engage in a wide portfolio of outdoor activities, such as backpacking, hunting, fishing, and hiking at higher rates than the general public (Getz & McConnell, 2014). The priorities within one’s personal set of outdoor activities might shift from one activity to another based on one’s current psychological needs, physical status, available time, or particular point in the life course (Goodsell et al., 2013).

Bradley B. said that he found mountain biking to strike a crucial balance at this point in his life:

As I got older, I realized more and more that that [nature] was kind of my happy place, and truly it didn't matter what it was. If it was hiking, biking, kayaking, whatever the case is, but that [mountain biking] was the one thing that was the perfect mix of speed, excitement, but not too physically demanding.

Although general experiences being outdoors in nature were common themes, Kat M., a mountain biker from mid-Michigan described specific sensory experiences she enjoys while biking: “I like to hear the wheel on the trail. The crunch of the leaves, the crunch of the snow, whatever. Mud. Mud makes a noise.” The general enjoyment of spending time outdoors is often punctuated by particular experiences that stick out in the individual’s memory, such as seeing wildlife or beautiful scenery: “I like the rivers and seeing the fish, and you know, “is that a Bluegill or is that”, you know, “what exactly is that?” I’m very curious. The sandhill cranes, you know? Just, nature’s awesome” (Jenna H). Bob D. also mentioned seeing wildlife while biking as an exciting factor: “And the sights, you see wildlife. When you’re cycling it’s different than walking. A lot of the wildlife doesn’t tend to get spooked as easily for some reason when you’re on a cycle. I don’t know why that is.” Although some birdwatchers had a different view on the effects of other user groups on wildlife, Bob drew his satisfaction from multiple experiential aspects of nature-based recreation, echoing the concept of “multiple satisfactions” among outdoor recreationists (Hendee, 1974):

I like being outside. I like doing those things outdoors. If I don’t see any game when I’m hunting, I still like being outdoors and seeing the things I’m not shooting at. And if I’m fishing, I like being along the water and seeing the things that go with that. So you know, I don’t have to be catching fish. (Bob D.)

Place-based and environmental factors

The recreational experience is inextricably linked to the *setting* in which it occurs (Manfredo et al., 1983; McCool et al., 1984; Brooks et al., 2006; Taylor, 2010). Pull motivations refer to aspects of destinations that are external to the recreationist (Goossens, 2000; Klenosky, 2002). “It’s really thrilling for me, how you can really get into a place and know it and

understand it. There's something very intimate about how you can know a place and its very local subtlety” (James H.) The pull of recreational settings and place-based motivations for the recreationists I interviewed were defined in various ways with mountain bikers placing a greater emphasis on aesthetics, natural settings, and trail characteristics, while birdwatchers spoke more about ease of access, habitat variety, and services or amenities.

Mountain bikers have a narrower range of optimal settings, with “fast and flowy” single-track trails in natural environments being highly desired (Taylor, 2010). Many mountain bikers talked about ideal trail characteristics and differences between hand-built trails and machine-built trails. Hand-built trails are usually multiple use (e.g., national forest trails) and not designed specifically for mountain biking experiences. However, they provide an immersive experience in nature that holds appeal for many mountain bikers. They are also more common and easily accessible than purpose-built trails or facilities that cater to mountain bikers (Taylor, 2010). Machine-built trails offer a “rollercoaster” type of experience, with obstacles, berms, and jumps strategically placed. This type of trail was clearly preferred by mountain bikers: “...that area [Copper Harbor] has become a destination for mountain bikers on a trail system that you can't find anything like here. You've got A and B lines, so easy ones and hard ones. You're talking jumps, rock drops. It's amazing.” (Bradley B). Despite a preference for the excitement offered by purpose-built environments, a diversity of settings and experiences was important: “Technical stuff is fun, but I like the flow trails too. I like a diversity of things... Just being able to mix up the riding is fun” (Pete D).

Birdwatchers have a broader range of available habitats in both built and natural settings; for instance, several birdwatchers I interviewed mentioned one of their favorite places to view birds was a wastewater treatment plant. Birds are ubiquitous and occupy a diversity of habitats

across the globe, presenting an abundance of opportunities for observing them (Recher, 1969).

James H. talked about the ease with which people can observe birds simply due to their ecology:

A lot of people ask you as a birder, why do you like birds? And I say, the easy answer is, they're everywhere. They're colorful and they are these organisms that, because of flight ... flight is such an easy way to escape. So I think it's due to flight that they can just perch two meters away from you and sing without fearing being caught.

Many birdwatchers from southeastern Michigan preferred the built and structured environment of the local Metroparks and suburban neighborhoods as opposed to the more remote game areas:

“Leave that to the nature people” (Sean W). Others preferred remote settings enabled by wildlife refuges, parks and forests, grasslands, and wetlands. Pam B., a birdwatcher from northern

Michigan spoke of the diversity of habitats at some of her frequently visited birding areas: “You go through grassland habitat, woodland habitat, a couple ponds. So some nice diversity.”

Optimal birdwatching settings often coincided with seasonal migratory behavior: “You can sit anywhere along Point Pelee [National Park] in the spring or in the fall and see just incredible numbers of birds. They're usually tired when they get there, so they just plop down in the nearest tree or bush.” (John W.)

In a broad sense, people are drawn to places with natural amenities that enable nature-based experiences to improve their quality of life. For instance, Bradley B., a northern Michigan mountain biker, described the pull of the region based on proximity to natural amenities:

First of all, this area, we'll say the Traverse City area, Grand Traverse County, Northwest Michigan, however you want to define it, people live for their outdoor activities out here. I mean, that's why my wife and I moved here. We moved here for outdoor amenities. We moved here for woods and water and trails and beaches and all that.

Conversely, Sean W., a birdwatcher and lifelong southeast Michigan resident, explained the pull of his local Metroparks:

Lake St. Clair Metro Park is a great park...it's nice because it is small so you can do the whole park in two or three hours. And also because it's right on the water, it's a big migratory stop off. So in May, you can walk through any part of the woods there and it's filled with warblers. I really like Stony Creek because one, it's close, but there's a huge variety of habitat there. I also like Stony because it has the mountain biking trails and I really like their nature center, their nature center trails. They have tons of other trails. They have the big lake, so you can go paddle boarding, and row boating, they have all kinds of boat stuff. You can take your own boat there. They just opened up a ropes course over the last year or two there. I haven't been on it but it looks cool. And I just heard the other day that they are proposing a dog park at Stony, which is fantastic because I'd like a dog park for my dog.

Sean was drawn to the aspects of parks that enable successful birding experiences (e.g., variety of habitat) but also the diversity of amenities that can augment the experience and attract a wider range of people into the outdoors. I asked Sean if he was concerned about the added amenities and crowds that might accompany development in terms of impacts on birds and he explained:

I think more and more people need to be forced outside more than they currently are. And you can't just build something and hope people need it, you have to give people what they want. And what they want are things like a cool restaurant, a ropes course, a dog park, stuff like that. That's going to get people to go into the park that will provide funding for everything else. Without taking away from like the cool habitat and the trails which is ultimately what the park's for in the first place.

An integral component of the setting for nature-based experiences was *access*. Both mountain bikers and birdwatchers talked about convenience and ease of access as important motivators, as well as infrastructure that makes the experiences possible in the first place. Mountain biking provided access to “places you don’t normally see” (Jeff R.). Jenna H. compared mountain biking to hiking in the ability to cover more ground on a bike in the same amount of time, see more of the landscape, and “enrich that experience a bit easier than hiking it.” Other mountain bikers talked about the appeal of being able to “ride to the ride” (i.e., the ability to conveniently ride from one’s home to the trailhead). Birdwatchers spoke about the convenience of birding around the neighborhood and carrying binoculars with them on routine errands, which encouraged them to walk more and get more exercise, “because our purpose is not just to bird. Our purpose is to be outside and get some exercise and get some fresh air” (Kim W).

One aspect that clearly set mountain bikers apart from birdwatchers in my interviews was the commitment and eagerness with which mountain bikers participated in *trail development and maintenance* activities. The most common topic of conversation introduced by the mountain bikers I interviewed was sustainable trail development and maintenance. Mountain bikers involved with local organizations took pride in participating in “trail days”, or dedicated maintenance days where riders gathered and improved trails. Jeff R. said, “I’ve been maintaining existing trails, developing new trails, and just enjoying it.” Speaking for others in his local Mountain Bike Association (MBA) chapter, Jeff went on: “Everybody wants to make sure they’re not tearing the trails up. They don’t want to rut the trails. They don’t want to do damage, because we’re trying to be good stewards of the trails.” When I asked Bradley why he participated in trail days, he answered simply: “Why do I go help clear a trail? So I can go ride

that trail. If I ride the trails, I better support them. That's it, you know?" Kat M. viewed those responsibilities extending beyond dedicated trail days, indicating the presence of descriptive social norms (Niemic et al., 2020) present in the mountain biking community: "I think responsible mountain bikers take care of their own trails. It's just a thing. You just do it. Every time you go out, you pick up sticks, you pick up trash, you do all of that stuff." According to Jeremy W.:

I can say this definitively. It sounds like a bold statement, but the number one user group in the past 20 years at these park and rec single-track trail systems who have worked towards upkeep are the different mountain bike association chapters.

Trail characteristics seemed to have a greater influence on mountain biking experiences than birdwatching. The fast-paced nature of biking leaves little room for error, necessitating immediate cognitive processing and anticipating obstacles to achieve flow states that optimally match the challenges of the landscape with the skill of the rider (Nakamura & Csikszentmihalyi, 2014). This may be one reason why many of the mountain bikers were adamant about sustainable trail development and maintenance: "...part of our mission became to educate people about proper environmental sustainability in constructing trails" (Jeremy W). Riders are continually "engaging with the trail" while they ride and they come to anticipate obstacles: "If there is a tree down in the trail, if I'm hiking, I can hop over it. But if there's a tree down as a biker, it's so much of a bigger deal... the environment impacts my ride in such a different way." (Roxanne P). Roxanne detailed the experiential aspects of biking that differ from hiking and how it gives a different perspective on the surrounding landscape:

I think that there's something about being on a bike that helps you see or that helps you be aware of the contours of the land in a way that just doesn't matter as much when you're

hiking. You can still have a beautiful hike where a trail's going straight up the hill.

Whereas, when you're biking, if you can really kind of play into those curves, it's a really engaging, fun ride that, for me, has made me more aware of the landscape in a different way.

In addition to trail characteristics and setting attributes, interactions with other user groups had the ability to shape participants' experiences in positive or negative ways.

Birdwatching by nature is generally a slow-paced activity that necessitates patience and observational skills, making participants more apt to perceive disturbances from other users that directly affect their experience. The concept of *multiple use* was often raised in conjunction with trail development and maintenance by mountain bikers. Stemming from the multiple use philosophy of the United States national forest system (Williams, 2005), the idea of multiple use emphasizes balancing the management needs of multiple user groups, industry, recreation, and fish and wildlife habitat to provide for a diversity of experiences and benefits. Most mountain bikers were aware of other users and wished to create positive social impacts while avoiding conflicts. Jeremy W. described his past involvement in advocating for sustainable trails because the trails in his area "weren't designed with multiple users in mind. Most of them were passive recreation use, and they weren't designed to be sustainable." Not all interviewees, however, were on board with the multiple use philosophy. Mark P., a birdwatcher from the upper peninsula, felt that multiple use trails crowd out the quieter, more passive or appreciative activities like birdwatching:

Once it's multiple use and everybody's sharing, it doesn't work, because then you get the people who are really interested in nature, if there's mountain bikers coming through, "On your left, on your left", snowmobiles or whatever, ATVs, you're not going to see

anything nature wise. And so then the nature nuts will squawk and then the mountain bikers and ATV'ers are already used to using that trail, they don't want to give it up. Can't blame them. And so multi-use actually ends up with there being fewer places, not more, because you lose that whole quiet nature experience. Drops out. And only the more intense uses are left.

Having been an early pioneer and advocate for mountain biking in the 1980s, Jeremy W. spoke frequently about the relationships between mountain bikers, other trail users, and management entities: "A lot of it was predicated on social impacts as well as perceived environmental impacts. There wasn't a lot of data at the time about impacts of mountain bikes on the trail tread, on the surface." He added, "A lot of studies were done during the '90s, showing that the impact of a bike tire is pretty much the same as that of a hiking boot." Bradley B. echoed this perspective:

I think people are starting to realize that mountain bikers aren't this destructive force that they thought they were. I've hiked a lot of trail systems that had some of the shittiest erosion and worst roots and washout and sand, just because they're not maintained. That is it, one hundred percent. You can't put a trail system in and just leave it.

Jeremy W. again reiterated the importance of trail maintenance and treating trails with the same active management approach as other natural resources: "We have to manage it [hunting and fishing]. It's the same with trails: we have to look at them as a resource that needs to be managed and sustained."

Birdwatching encourages attentiveness to the surrounding environment, leading to a wealth of ecological and natural history knowledge (Watson, 2016). Birdwatchers spoke frequently about aspects of birding in local environments that led them to value *local knowledge*.

Leah J. talked about the benefits of specializing in one particular place and the subsequent relationship she developed with the place and even individual birds:

When you dedicate yourself to one park or a township or your yard. Usually it's smaller, like a park or your yard. And you just see what you can find in that one area. You kind of get to know your birds, like who's nesting there, exactly within a day or two, when are they going to come back in the spring? When are they going to leave in the fall? You get kind of a relationship with the birds that are in your corner of the world.

Additionally, Mark P. described his birding as “hyper-local” and focused mainly on a single mile stretch of beach near Munising several times per week:

I'll go to a spot where I think such and such a bird might show up, I go there day after day after day after day, when the pattern looks right and then most years, no good. But then all of a sudden, poof, you get it. So right now I'm at 310 species for the county.

With an intimate understanding of a place comes an awareness of changes or disturbances that change the character of that place. Mark further described the intensity with which he birdwatches in one particular area and has developed a deep sensitivity to the various effects of environmental and social changes in the region: “The number of shore birds on that beach every year is less and less, and the human intensity is just nuts. The “Pure Michigan” campaign has crammed people down our throats here.” Diane N., another birdwatcher from northern Michigan, also mentioned the impact of tourism on the local environment: “We are very blessed in rural America to have clean air and clean water and the quiet sounds of nature, except for during tourist season.”

Clearly, deep attachments to places, nature, and wildlife can lead to concern or even distress when development, environmental changes, or other people threaten those resources. As

Mark said, “it’s a very depressing situation.” He also evoked Kahn’s (2002) “generational amnesia” theory, echoing Garst and colleagues (2009) in finding that successive generations of forest campers tend to accept increasingly degraded environmental conditions as the norm:

And new birders, they don't know what it used to be like. It's a sliding threshold of dissatisfaction, so to speak. If you started birding in the early 70's you used to not be able to get out of the parking lot, because there were so many warblers all over the trees and the edges of the parking lot, and now you just don't ever hardly ever experience anything like that; it's a very dramatic change in bird populations.

As each generation comes to accept a “new normal” in terms of environmental and social conditions, motivations for engaging in environmentally friendly stewardship actions might decrease if they do not perceive ongoing threats to the environment. The need for education facilitated by outdoor recreation was commonly mentioned by both groups of interviewees in various contexts. Many expressed a desire to *share skills and knowledge* with others. Jeremy W. viewed experiential, place-based aspects of mountain biking as a conduit to teach people about nature and stewardship:

But this is what I love about mountain biking, too, is, for me it's a vehicle to get people to care about natural spaces. It's a vehicle to get them to want to preserve and protect areas that maybe they wouldn't care about otherwise. I always say about trails, and mountain biking, is: if people don't interact with nature, they won't appreciate nature. And if they don't appreciate nature, they won't want to preserve nature.

Some participants connected their participation in birdwatching or mountain biking to broader *environmental* and *economic impacts*. Local communities depend on wildlife recreation and tourism to generate revenue for rural economies (Larson et al., 2014; Poudyal et al., 2020),

but some see wildlife-associated recreation in decline: “I know they don't hunt and fish and birdwatch as much, but I get the sense that they're doing other things outside... trails and biking and hiking and paddle boarding...” (David P). Jeremy W. echoed David’s observations:

“Because they want those things as opposed to solitary hiking, fishing, or birdwatching, it doesn't mean they don't appreciate nature. They just are choosing to interact with the natural world in a different way.” Michael H. added, “hunting to me is like a brand that never evolved.”

Mountain bikers connected the growth of economic sectors that appeal to their demographic to the growing popularity of mountain biking: “They've already realized that, oh yeah, there's more breweries, there's more tourism. There's a lot, and it's due to the mountain bike trails” (Jenna H). “Look at all the mountain bikes on cars, and then you go walk into Bell's Brewery. It used to be this little hole in the wall. 80% of the people in there on a summer weekend are there for the trails.” (Richard W).

Leah J. made a conscious effort to let local business-owners know the purpose of her travel:

When I'm traveling in the U.P. and I'm staying at a hotel or eating at a restaurant, I let them know that I'm up there for the birds so that members of that community understand that it is a resource and there's an economic value to maintaining some of those wild spaces because people are going to come and spend money in their town.

Derek W. sees partnerships with management agencies, local governments, and other organizations as playing a critical role in advocating for the needs of mountain bikers, developing sustainable trails, and encouraging responsible social and environmental stewardship:

We're trying to do the best to educate the community how the trails are developed and built. There's a lot of thought and planning going into them, it's not just carving out a trail through the woods. It has really taken a lot more involvement with the DNR, with the

local communities, the governing bodies, the townships, to develop a plan, a strategy to do this and how it can impact the community as a whole in a positive way.

Nature-based recreation and self-identity

For many with whom I spoke, what started as casual participation often became more central to their life over time and mingled with aspects of their identity and lifestyle, prompting changes in daily life routines and structures in ways that are indicative of “serious leisure” (Stebbins, 1992). For these folks, motivations are not always discrete or conscious but integrated into their lives to fulfill basic needs: “It’s not just about the biking. I mean, we’ve gone to weddings together. Had baby showers. We spend holidays together. Fourth of July together. Father’s Day” (Kat M). Social interaction offered interviewees a sense of connection to each other, which further enriched the quality of experiences in nature and strengthened their sense of identity and place. Most of my mountain biker interviewees were involved with local MBAs as participants or in leadership roles. Many mountain bikers spoke fondly of attending group rides, sometimes with dozens of other riders. Heather W. is a mountain biker from Traverse City who found a sense of community with other bikers: “I love the community here, I train with people all year. We’re training inside, we ride outside. It’s a lot of great people up here, those are kind of my social connections, they are all bikers.”

Several themes emerged related to the need for interviewees to affirm (or reaffirm) their identity as a birdwatcher or mountain biker. Themes I identified were most prevalent among the most committed and involved participants; casual participants had less well-developed identities, and they indicated less attachment to the outdoor recreation community. Interviewees almost invariably discussed the importance of childhood experiences to developing their “outdoor enthusiast” identity. Most traced their participation in nature-based activities back to childhood

experiences in nature. Mountain bikers of all ages spoke fondly of time spent riding bikes as kids in their neighborhood; birdwatchers spoke of time spent playing outside and observing nature as kids. Sean W., a birdwatcher from southeast Michigan, sees his participation in birdwatching as part of an identity stretching back to his childhood that emphasizes and appreciates all aspects of nature and wildlife:

I've always liked being outside and hiking and animals and stuff like that. I was always the kid with the butterfly net at the pond catching the frogs and keeping the turtles, you keep them in a bucket outside all summer, and I always liked being outside and outdoors stuff.

Leah J. also said that her parents were influential in shaping her views on nature, stating that “after mama and daddy, my first words were bird and fish.” Experiences in nature through birdwatching also strengthened relationships with Leah’s children, enriching the time they spend together outdoors: “...and the girls, they're game for the adventure. They're not always game for birding, but there's enough other stuff to look at; they're spreading milkweed seeds, or collecting feathers, or making wreaths out of long prairie grasses.” Birdwatching was a mechanism for the entire family to get outside and find individual ways of connecting to nature while also strengthening family bonds.

The childhood experiences of participants sometimes led them to take on educator and mentorship roles for today’s youth. Derek W. views mountain biking as a solution to contemporary challenges in connecting youth with nature:

In the Millennial age, kids have all got their screens: their iPads, their iPhones, and stuff like that. They're not getting outside, so this is a way to get these kids outside, on bikes.

They're using it to make safer routes to school, so the kids can ride their bikes to schools in safe groups, be able to do cross walks, and they're doing a great job.

Michael H., a mountain biker in Marquette and associate of an organization that focuses on youth mountain biking expressed the importance of connecting youth to the outdoors:

They [the kids] are developing this sense of belonging, this identity. Well, it's good to have an identity and sense of belonging to something, because that can then start to turn into purpose, which can also turn into self-confidence, which can turn into independence, which hopefully all leads to the individual being more durable. Because mountain biking by nature is full of inherent risk that you assume simply by getting on the seat. And then, by taking on progressively more difficult and dangerous obstacles you're going to build confidence through that durability.

Michael relayed the story of his initiation into mountain biking after a debilitating back injury. He wanted to impart the benefits he received from biking and the confidence he gained by improving his skills and overcoming challenges on the road to recovery. He wanted to help others gain a similar sense of self-efficacy and learn to “become a stronger person”. Further, he went on to say that the skills they teach use mountain biking as a mechanism, but “it does not hinge on biking:”

So, it could be a bike, it could be a pair of running shoes, it could be a bow and arrow, it could be a rifle, it could be a tennis racket, baseball bat. I think we're teaching the kids how to create a different perspective around what competition is, what self-improvement and development looks like.

Some mountain bikers and birdwatchers viewed *environmentalism* and *conservation* as important aspects of their identity that strengthened their relationship with nature, other people,

and places. For mountain bikers, it often begins with education through MBA chapters about the impacts of mountain bikes on trails and development of trail standards. Trails are often closed temporarily, especially in spring when rain is more common, to prevent erosion and ruts: “When we first started, if you just tell them, “Hey, the trail is closed.” They’d be in an uproar. But now, people understand the impacts on the trail, and they understand the need to close the trail” (Jeremy W). As people became more aware of their impacts directly on the local environment, they began to think about their effects more generally, beyond the immediate action of mountain biking, to think about other environmental issues. Eric H. attributed this spread of education and awareness of trail standards and ethics in the mountain biking community at least partly to social media, which has “helped immensely in getting people engaged and kind of highlighting the conservation part of it.” Pete D. went on to describe his definition of conservation: “I think for me it’s just a sustainable aspect of taking what you need but making sure that you’re leaving enough for future generations, too.” Bradley B. took a big picture view connecting his participation in mountain biking with “the whole aspect of it – of the wildlife, taking care of the trails, donating the money, donating the time.”

Birdwatchers tended to view conservation from an individual action or stewardship perspective. Leah J. talked about “doing things locally” and supporting conservation “through charitable giving”:

It's little things like we pick up a lot of trash. We have plastic gloves and the trash reachers and the garbage bags in the back of both cars, so wherever we are we can do that sort of cleanup, when inspiration hits. And then it is participation in things that advocate for the preservation of wildlife and wild spaces, like Audubon and Sierra and MPCA.

Leah's perspectives on conservation have evolved, and she said that "20 years ago I was probably like "let wild be wild", but now I see a greater role and responsibility for people." She also expressed a desire to support state-led conservation efforts by "buying fishing licenses in years I don't fish", and engaging in discussions about buying duck stamps and contributing to public comment periods for proposed regulations:

I've heard this conversation about birdwatchers buying duck stamps to support wetlands conservation. I haven't quite jumped yet... there's no philosophical reason I'm against it, I just haven't pulled up the website and all that. I see the calls for public input, especially like right now, bag limits on trout in the U.P. and stuff like that. I'm skeptical that my voice or my letter to them makes much of a difference.

Most respondents viewed the role of conservation primarily through the lens of organizations (e.g., Sierra Club, Audubon Society, Ducks Unlimited) and personal responsibility through direct behaviors that impact the environment in positive ways. Jeff R. found that working on trails helps other mountain bikers to "feel more responsible for the trail when they're out riding." In that sense, norms and ethics for responsible trail behavior, stewardship, and conservation seemed to permeate through the mountain biking community. Organized volunteerism among the birdwatchers I interviewed was less common than with mountain bikers, but most were involved with local birding clubs (e.g., Audubon Society) in some capacity, and many held strong individual ethical and moral positions on their environmental responsibilities: "We think environmental protection is really important for human species survival in the long term, and we pay to voluntarily support the organizations or the programs that protect what we like, and so it's part of our lifestyle philosophy to do that." (David P.) Birding requires an attentiveness to one's surroundings and an expanding of awareness that lends itself to the

development of an environmental ethic (Watson, 2016). For example, an understanding of migratory paths could logically lead a birder observing an arctic owl in Michigan during the winter to imagine its habitat during the summer in the arctic, and how human actions might be affecting the owls in both places:

In their bodies, they are moving energy around, energy and matter all over the planet.

They're connecting the South Pole, the North Pole and every place in-between. And so it's just such a beautiful thing. I mean, bird migration is absolutely a gorgeous thing.

(Alice N.)

Broader meanings of experiences in nature

Birdwatching and mountain biking represent different modes of nature-based experience, with participants focusing their attention on the environment in different ways (Walker & Shafer, 2011). Through nature-based experiences, participants aim to acquire physical, social, and psychological benefits, ultimately leading to a more meaningful and enriched life (Patterson et al., 1998). The intrinsic and place-based motivations I identified through my interviews point toward more abstract higher-order meanings through experiences in nature that often lead to finding and affirming a sense of connection and purpose (Kellert & Wilson, 1993; Mayer & Frantz, 2004; Hinds & Sparks, 2008; Enck, 2013; Hassell et al., 2015; Lumber et al., 2017). Social identity theory (Hogg, 2020) describes the processes through which people come to identify as a member of a particular group. Stages of socialization as a group member and development of an identity (e.g., birdwatcher, mountain biker, outdoors enthusiast, environmentalist, conservationist, etc.) are often facilitated by various individuals and institutions, such as public lands management agencies, industry manufacturers and retailers,

media sources, family members, clubs and organizations, friends and companions, and other mentors (Enck, 2013).

Participants were able to affirm or reaffirm their self-identity through re-living childhood experiences in nature, mentorship from friends or family, or socialization within the birding or mountain biking communities that led to feelings of competence, self-efficacy, resilience, and growth. This connection (or reconnecting) to oneself resulted in improved physical and mental health: “It's a good way for me to recharge, like after a long day I might head out and just drive around or go to one of my favorite spots and bird watch by myself for a while” (Leah J).

Participants found a sense of reconnection to themselves by experiencing the simplicity of nature, leading to feelings of relaxation. Observing birds or going for a bike ride in the woods served to “declutter” the busy and hectic lives of participants that often disconnects them from the benefits nature can provide (Popkin, 1999; Kellert, 2002), resulting in a more centered return to daily life (Hassell et al., 2015).

Birdwatching and mountain biking experiences also connected participants to each other through social and community interactions, strengthening relationships with mentors, family, or friends, and sharing knowledge, skills, and experiences with others. Most of the mountain bikers I interviewed were involved with MBA chapters or other local trails organizations and indicated a strong attachment to the mountain bike community. They were motivated to engage in social events, trail maintenance, and organized rides that brought them closer together and formed bonds that extended beyond the immediate mountain biking experience. Birdwatchers were involved with local Audubon chapters as well as various other organizations and were engaged in leading or participating in bird walks, citizen science projects, and other forms of stewardship and volunteerism. For many, teaching and sharing knowledge was the highest form of

stewardship: “Why we’re doing what we’re doing is to help create a connection between the kids and the outdoors, thinking forward that those kids will become stewards for our community and resources” (Michael H). Interactions with family helped strengthen bonds by encouraging communication and reflection facilitated by natural settings. Connecting to each other through social groups can provide structure, purpose, and meaning by associating one’s identity with that group or organization (Enck, 2013). The recreationists I interviewed found meaning and satisfaction in social interactions facilitated by participation in birdwatching and mountain biking, as well as identification and involvement with those respective communities: “I think those kinds of things cultivate relationships, and cultivating relationships encourages the strength of the organization” (Kat M).

Birdwatching and mountain biking also represented important ways for participants to connect with nature through recreational experiences, developing local knowledge, discovering new things, and developing deeper and more intimate connections to the natural world: “I think that's key to providing all the benefits that outdoor stuff provides the people, like peace of mind and health and diminished anxiety and all that, plus saving energy and protecting our climate and environment” (David P). People have an innate need to spend time in nature (i.e., “biophilia”; Kellert & Wilson, 1993). Childhood experiences in nature are an important predictor of commitment to environmental protection as adults (Chawla, 1999), and children who spend time in nature have been shown to have better cognitive and mental health outcomes (Kellert, 2002). Many factors, however, such as competing interests, lack of time, socio-demographic changes (e.g., urbanization) have led to a growing disconnection from nature (Louv, 2008; Pergams & Zaradic, 2008; Karns et al., 2015). Nature-based recreation provides a way for people to reconnect with our roots: “But, if you take us back, de-evolve us back to our beginning, this

sunlight, the trees, the outdoors, the nature, this was our original beginning. This was our original workshop, playground, school room” (Michael H). This reconnection to nature was an emergent higher-order meaning for my interviewees as they described their experiences. Interviewees developed relationships with the places in nature through recreation that contributed to their self-identity (Brooks et al., 2006). Those who were less concerned with outcomes related directly to birding or mountain biking and more interested in generalized experiences in nature were more apt to notice the negative or inappropriate behaviors of others. As Diane N. described:

I want to encourage people to interact with wildlife, but I don't know how to encourage them to do so respectfully and with kindness and love and passion and let the wildlife teach us. So that's my great dilemma at this point in life, and I'll probably die before I ever figure out the answer to that.

The connections my interviewees developed through nature-based experiences were not discreet. In other words, development of identity and connections to other people and nature often went hand-in-hand in a nested fashion (Figure 2.2). This idea is exemplified again by Diane who went on to describe her life-long experiences learning about nature, facilitated by her family, and connected to other aspects of her identity such as education and social justice:

But again, my father used to teach me that learning is a lifelong process. From that standpoint, being able to interact with nature on a daily basis is learning. I think if we spent more time, again, watching wildlife and how they interact with the world and each other, we would learn a lot.

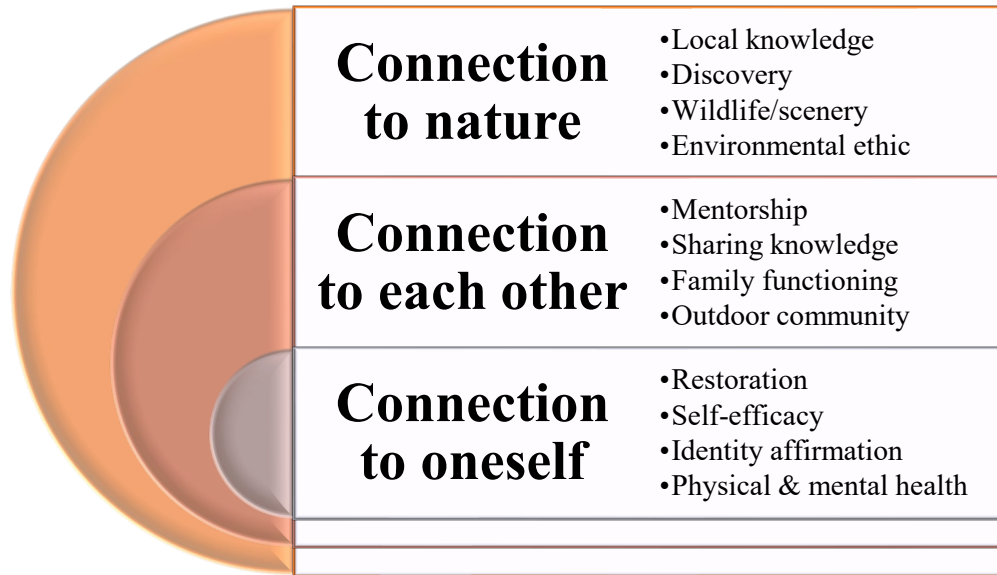


Figure 2.2: Nested themes of connection to self, others, and nature through birdwatching and mountain biking experiences.

Conclusions

This study explored the nature-based experiences of mountain bikers and birdwatchers in Michigan and identified important motivating factors that contribute to emergent meanings of experiences in nature. The findings emerging from the data broadly align with previous benefits-based investigations of push and pull motivating factors for leisure, sport, exercise, and outdoor recreation (e.g., Brooks et al., 2006; Garst et al., 2009; Hassell et al., 2015; Lumber et al., 2017; McIntosh & Wright, 2017; Fix et al., 2018). My study, however, extends the bounds of previous exploratory frameworks and attempted to draw connections between recreational motivations, experiences and meanings, and environmental conservation perspectives.

Previous research conceptualized recreational motivation, participation, and outcomes as a linear process where expectations and desires motivate participation which leads to desired outcomes and satisfaction (Driver & Tocher, 1970). My research and others, however, suggests that meanings are emergent and may be temporally separated from the recreational experience (McIntosh & Wright, 2017; Fix et al., 2018). The extent to which participants reflect on their

experiences and how it affects their lives contributes to the development of affective attachments to places, activities, people, and landscapes involved with the activity (Høyem, 2020). My findings align with Hassell et al. (2015) and Garst et al. (2009) in finding that nature-based experiences are important to facilitating a sense of (re)connection to oneself, others, and nature, and that the benefits received extend beyond the recreational experience into other areas of participants' lives (Brooks et al., 2006). This research provides further theoretical development of benefits-based typologies for managers to consider in the development of products, services, amenities, and educational material that considers the deeper meanings associated with nature-based experiences. Moreover, my findings help provide an integrated understanding of the links between nature-based experiences and the benefits recreationists desire, which presents novel pathways for stakeholder outreach and engagement to facilitate satisfactory and meaningful experiences in nature (Moyle et al., 2014).

Limitations and future research

The sample interviewed for this study were likely not representative of the general population of birdwatchers or mountain bikers. Although more a feature of qualitative research than a limitation, it does affect the inferences able to be drawn from the data. Participants were avid and active in birdwatching and mountain biking, and likely would be considered highly specialized in their recreational pursuits (Bryan, 2000). The influence of casual participants might alter the conclusions reached from these data. Though representing a wide range of ages, my sample was limited to Michigan residents from a white ethnic background. Future research would benefit from a focus on more demographically diverse characteristics and perspectives. Additionally, birdwatching and mountain biking represent two out of dozens of options for participating in nature-based recreation. Further theoretical development and development of

typologies to characterize benefits-based management approaches will need to consider broader experiences in nature to explore the range of experiential, cognitive, and affective dimensions associated with nature-based recreation.

CHAPTER 3: STAKEHOLDER SUPPORT FOR WILDLIFE CONSERVATION FUNDING POLICIES: MICHIGAN HUNTERS AND WILDLIFE WATCHERS

Abstract

Wildlife conservation in the United States has long depended on a “user-pay” funding model that relies on revenue from hunting license sales and a federal excise tax on firearms, ammunition, and archery equipment. Declines in hunting participation, however, jeopardize the sustainability of the current funding model. Ensuring public support for wildlife management and conservation may require expanding sources of funding and incorporating the perspectives and values of a diversifying base of stakeholders into decision making processes. We used a web-based survey of outdoor recreationists in Michigan, USA to evaluate support for a range of conservation funding policies. Respondents (n=3500) self-identified primarily as hunters (n=2558) or wildlife watchers (n=942). We used binary logistic regression to evaluate support for four conservation funding policy options: state sales tax, lottery proceeds, extractive industry revenue, and a user-based tax on outdoor gear (i.e., “backpack tax”). Determinants of support varied by type of policy and stakeholder characteristics. We found no statistically significant differences between hunters and wildlife watchers in support for conservation funding policies when accounting for other variables such as wildlife value orientations, engagement in stewardship behaviors, age, and gender. The industry-based policy achieved the greatest level of approval, while the backpack tax had the lowest. Respondents were mixed in their support of the sales tax and lottery proceeds options. Cluster analysis revealed three homogenous groups related to conservation funding policies: ‘strong support,’ ‘mixed/opposed,’ and ‘anti-backpack tax.’ Clusters differed in their support for conservation funding policies and on psychological and demographic variables. The ‘strong support’ and ‘anti-backpack tax’ groups differed in their levels of stewardship engagement, knowledge of conservation funding mechanisms, and support

for the backpack tax option. The ‘mixed-opposed’ group tended to be older, less educated, and less likely to be a member of a conservation organization. Results suggest support for conservation funding differs by policy type and social and psychological characteristics of stakeholders. Increased support for conservation could provide long-term solutions to the looming funding crisis facing state wildlife agencies and may help wildlife professionals improve governance and decision-making frameworks to achieve conservation goals valued by society.

Introduction

Contemporary threats to biodiversity include global impacts stemming from climate change, population growth, land use changes, development, and geopolitical conflict, leading to significant risks for wildlife species and habitats (Leemans & Groot, 2003; Male & Bean, 2005; Intergovernmental Panel on Climate Change, 2019). In North America, public support and participation in wildlife management has emerged as a critical component to successful conservation, as well as a challenge for the wildlife profession (Decker et al., 2021). Hunters have played an integral role in achieving conservation successes by direct participation in wildlife management through game harvest and indirectly through monetary contributions to state fish and game programs (Heffelfinger et al., 2013). Monetary contributions from hunters primarily have come from state hunting license sales and a federal excise tax on hunting equipment, ammunition, and archery equipment (Duda et al., 2021). If hunting participation further declines, however, state wildlife agencies face a shrinking revenue base, with repercussions for wildlife management and conservation efforts (Echols et al., 2019).

The proportion of Americans who hunt dropped by nearly 30% since the 1980s (USFWS, 2018) and is projected to continue declining, primarily due to demographic and social-structural

transitions in society that have led to changing priorities and perspectives regarding wildlife (Cordell, 2012; Winkler & Warnke, 2013; Larson et al., 2014). Additionally, the socio-cultural context of society has shifted, leading to values and expectations for wildlife management that are not always compatible with consumptive uses such as hunting (Manfredo et al., 2018). Non-hunting forms of outdoor recreation have increased in popularity, with wildlife watching³ among the fastest-growing activities (Cordell, 2008; USFWS, 2018). Practitioners face an unfamiliar demographic landscape as users of public lands become more ethnically diverse, urbanized, and protectionist in their orientations toward wildlife and interactions with nature (Teel & Manfredo, 2010; Manfredo et al., 2018).

Interest and appreciation for nature, wildlife, and outdoor recreation remains high (Kellert et al., 2017), yet the economic and social effects of historical funding models narrows the scope of available options for funding conservation. Jacobson et al. (2010) proposed that successfully adapting the wildlife conservation institution at the scale needed to maintain relevancy in contemporary society requires broad-based funding from public sources of taxation rather than expanding the current "user-pay" model. Doing so may facilitate more democratic forms of governance of wildlife resources and better alignment with the tenets of the public trust doctrine (PTD), which establishes that wildlife are public property and ought to be managed for public benefit (Horner, 2000). Others (e.g., Peterson, 1998; Regan, 2010) argue for expanded user-based taxes and fees on outdoor equipment used by a diversity of wildlife-associated recreationists. However, public support differs between the two approaches, and in both cases

³ Wildlife watching is defined as “closely observing, feeding, and photographing wildlife around the home or on trips away from home, visiting public parks around the home because of wildlife, and maintaining plantings and natural areas around the home for the benefit of wildlife” (Cordell, 2012, pg. 21).

institutional change often happens slowly as state agencies and policymakers face significant social and political barriers to adaptation (Jacobson et al., 2007).

The reliance on participation in hunting to support the current funding model creates barriers for the wildlife conservation institution to be inclusive and responsive to changing public needs, interests, and values (Decker et al., 2016). Questions are emerging regarding the sustainability of this approach and its effectiveness in accomplishing conservation goals and upholding the PTD in governance of wildlife resources. Understanding the perspectives of wildlife-associated recreationists and their preferences for conservation funding policies is an urgent priority (AFWA, 2019). Given that the wildlife conservation endeavor relies on public support for specific management actions, and support for conservation more broadly, this study provides information that might help policymakers and administrators understand the determinants of support for various conservation funding strategies.

More specifically, a better understanding of determinants of stakeholder support for alternative conservation funding mechanisms may: 1) enable policymakers to more effectively overcome political barriers to new conservation approaches, 2) help trustees and administrators frame policies according to the heterogeneity of wildlife stakeholders and predict how messages will resonate with different segments of the public, and 3) help agencies and organizations strategically develop an inclusive coalition of support for conservation that builds on shared values and expectations across broad segments of society, leading to a greater chance of successful conservation outcomes for wildlife and ecosystems.

I surveyed Michigan hunters and wildlife watchers to assess the relative influence of various social-psychological, behavioral, and demographic variables on the likelihood of supporting four proposed conservation funding policies: 1) Dedicate a portion of state sales tax

to conservation, 2) dedicate a portion of state lottery proceeds to conservation, 3) allocate revenue from companies that profit from natural resource extraction (oil, gas, timber, etc.) to conservation, and, 4) institute a “backpack tax” on outdoor gear (e.g., hiking gear, tents, binoculars, etc.) and use the proceeds to fund conservation. The objectives of this study were to investigate determinants of support for wildlife conservation policies among key wildlife-associated stakeholders: hunters and wildlife watchers, identify patterns of variables that predict support, and segment respondents into meaningful typologies that are of interest to policy and decision makers.

Background

Funding for wildlife conservation

Inadequate funding and lack of local acceptance and support are among the primary reasons why conservation efforts fail (Muhumuza and Balkwill, 2013). The “user-pay” model underpinning the North American system of conservation and the resulting institutional structures that emerged in the early 20th century were an opportune solution to integrate stakeholder participation and funding for wildlife management. Market hunting, resource exploitation, and habitat loss led to population declines of many wildlife species in the 19th century, and early conservationists viewed regulated hunting and population management as a way to democratize wildlife protection (Organ et al., 2012). Hunters and sportspeople were recruited as integral participants in this system of habitat management and regulated harvest, becoming the primary source of financial support and active management assistance to state wildlife agencies (Prukop & Regan, 2005). The Federal Aid in Wildlife Restoration Act (better known as the “Pittman-Robertson Act”, after the law’s Congressional sponsors) was passed in 1937 and levied an 11% excise tax on firearms and ammunition (and later amended to include

archery equipment) with proceeds distributed to state fish and game management agencies. Combined with state hunting license sales, these became the primary mechanisms for generating the states' funds for habitat management and acquisition (Organ et al., 2012).

Excise taxes derived from the Pittman-Robertson Act, state license sales, and general appropriations and other contributions have provided millions of dollars annually for fish and wildlife conservation, leading to the restoration of many imperiled wildlife species (Williams, 2010). However, state led conservation programs are often focused primarily on game species while non-game conservation programs are often under-funded (Anderson & Loomis, 2006; Dalrymple et al., 2012). Several attempts have been made in the past at state and federal levels to diversify the portfolio of conservation funding sources and broaden user-based taxes and fees to include non-game species and incorporate other wildlife-associated recreationists (e.g., the “Teaming with Wildlife” initiative would have codified an excise tax on general outdoor gear). Many of these efforts have faced opposition from the outdoor industry and special interest groups (Secunda, 1998; Outdoor Industry Association, 2017). Additionally, reallocation of state sales taxes, lottery proceeds, and alcohol taxes, state wildlife grants, various Farm Bill programs, and various federal programs (e.g., Land and Water Conservation Fund) have thus far have not achieved the level of financial support needed to sustain wildlife conservation efforts (Mangun and Shaw, 1984; Franklin and Reis, 1996; Anderson and Loomis, 2006; Echols et al., 2019; Duda et al., 2021).

Future conservation successes may depend on expanding funding models and incorporating the perspectives of broader interests and values toward wildlife (Nie, 2004; Jacobson et al., 2010; Decker et al., 2016). A better understanding of the factors that influence stakeholder support for alternative conservation funding mechanisms may improve trust and

transparency in decision making (Schroeder et al., 2021), enabling more effective governance of wildlife resources by trustees. Increased support for conservation funding may also help conservation advocates and decision makers build collaborative partnerships that alleviate political conflict and work toward sustainable funding models that incorporate the best interests of wildlife species and the diverse publics who value them.

Factors affecting stakeholder support for conservation strategies

Individual cognitions influence attitudes and behaviors in different contexts (Ajzen, 1991; Stern, 2000). Values form the basis of a cognitive hierarchy through which fundamental values and beliefs influence attitudes and behaviors (Rokeach, 1973). Value orientations, or patterns of basic beliefs, have been shown to influence public support in a range of policy and management contexts, including support for energy policy measures (Ziegler, 2019), climate change policies (Rhodes et al., 2017), national forest management preferences (Vaske et al., 2001), and general environmental protection (Inglehart, 1995). In the context of wildlife management and conservation, value orientations have been associated with support for species reintroduction in Germany (Hermann et al., 2013), wildlife conservation policy preferences in Patagonia, Chile (Serenari et al., 2015), and levels of support for management actions in Yellowstone National Park (Borrie et al., 2002).

Fulton et al. (1996) developed measurement scales for wildlife value orientations that resulted in a "use-protection" spectrum that segments stakeholders according to their wildlife-oriented beliefs regarding the nature of relationships between people and wildlife. Individuals tend to fall into "wildlife-use" (domination orientation) on one end of the spectrum or "wildlife rights" (mutualism orientation) on the other end. Wildlife value orientations are often associated with socio-cultural forces, such as economic modernization, urbanization, educational

attainment, and geographic mobility (Manfredo et al., 2009). In parallel fashion, broader society has shifted from an emphasis on materialist values that prioritize basic human needs like food, shelter, and safety, to a society characterized by post-materialist values and goals such as democratic governance, environmental protection, and self-expression (Inglehart & Baker, 2000). Together, shifting values and associated socio-demographic trends reflect the changing needs and expectations of the public toward nature, wildlife, and management of natural resources.

Place-based and contextual factors

Influences on behavior originate at multiple scales, and broader factors such as community-level dynamics, attachment to certain places or landscapes, and the regulatory environment synergistically influence perspectives on wildlife, nature, and conservation (Stedman, 2002; Larson et al., 2014). Local partnerships are often integral to the success of conservation efforts (e.g., community-based conservation) (Pretty & Smith, 2004), and studies have shown that stronger community attachments are associated with a higher likelihood of behaving in environmentally friendly ways (Macias & Williams, 2016). Place-based attachments can give people a sense of purpose and meaning when interacting with that place and potentially motivate positive actions to protect threatened landscapes or support management actions designed to protect them. For example, attachment to rural landscapes in Maine positively predicted residents' support for conservation planning efforts (Walker & Ryan, 2008).

Cognitive and place-based factors may work in tandem through contextual factors like recreationist specialization. Outdoor recreationists are theorized to move along a spectrum from generalist to specialist (beginner to advanced) as they gain skills, knowledge, and experience in their recreational activity (Bryan, 1977). As specialization level changes, so do motivations and

resulting satisfaction, setting and site preferences, and support for management actions (Martin, 1997). Activity specialists are thought to be more aware of management regulations and place more importance on place-based aspects of the recreational experience (Bricker & Kerstetter, 2000), indicating that place attachment and support for management decisions also depend on the extent to which one specializes in their recreational pursuits (Bryan, 2000). Further, highly specialized anglers have been shown to be more supportive of management actions including harvest restrictions (Oh & Ditton, 2006).

Nevertheless, the contribution of social capital, sense of place, and specialization in environmental behavioral models is often not measured, leading to spurious conclusions and biased estimates of environmental attitudes and behaviors (Lee, 1982). Linking place-based constructs, such as social capital and place attachment, with underlying value orientations and other social-psychological characteristics of individuals enables researchers to model the complex interactions that may lead to support for alternative conservation funding mechanisms. Additionally, the interactions between recreation participation, stewardship behaviors, and place-based concepts interest wildlife managers who wish to increase public support for conservation efforts (Larson et al., 2018).

Much empirical research has investigated how various social-psychological constructs such as cognitive factors, place-based motivations, and contextual influences such as specialization act as behavioral antecedents that affect stakeholder behavioral intentions. Studies of determinants of support for conservation funding, however, generally focus on socio-demographic characteristics (e.g., Kellert et al., 2017; Larson et al., 2021). My study incorporates social-psychological and place-based variables, based on a conceptual framework of

cognitive, affective, and normative influences on behavior (Ajzen, 1991; Stern, 2000), to investigate stakeholder support for alternative conservation funding strategies.

Methods

Sampling and data collection

I designed a web-based survey to measure support for conservation policy proposals among a sample of Michigan hunters and wildlife watchers. In addition, I gathered information on relevant behavioral, social-psychological, and demographic variables I expected to be associated with support for conservation funding policies. The web-based survey was administered by the Michigan Department of Natural Resources' Marketing and Outreach Division in June-August 2020 as part of a broader research effort using a tailored design method for internet surveys (Dillman et al. 2014). The survey was presented on the Qualtrics platform and distributed to 522,993 addresses in the MDNR e-mail database. After removing out-of-state responses, incomplete surveys, and respondents who received the survey link through external sources, I obtained a final sample of 19,143 responses (4%).

Participation in nature-based activities was assessed to segment respondents into recreational typologies based on self-reported measures of participation. Nature-based activities in which each individual participated were ranked such that the most important recreation became their “primary recreational activity” and allowed us to assign each respondent a recreational type. Since only one activity could be ranked #1, respondents could be segmented according to their primary recreational activity. Those who chose either hunting (n=2558) or wildlife watching⁴ (942) as their primary recreational activity were included in the sample for the

⁴ “Wildlife watching” category combined the reported activities wildlife viewing and birdwatching.

following analysis. Research protocols were approved by the Michigan State University Institutional Review Board (STUDY00001445; available in Appendix A).

Variables measured

My dependent variables were measured by four items asking respondents to rate their intention to support hypothetical scenarios designed to increase funding for wildlife conservation efforts on a 5-point scale: strongly oppose (1), somewhat oppose (2), neither support nor oppose (3), somewhat support (4), or strongly support (5). Items were chosen based on a review of policies proposed or adopted in various states to provide broadened funding sources for wildlife conservation and were deemed to adequately reflect respondent attitudes toward regulatory, policy, or management solutions to conservation funding dilemmas. Four items were chosen for analysis to assess support for broad-based funding measures for wildlife conservation:

1. Dedicate a portion of state sales tax to conservation.
2. Dedicate a portion of state lottery proceeds to conservation.
3. Companies that profit from natural resource extraction (oil/gas, timber, etc.) contribute a portion of their annual revenue to conservation.
4. Institute a “backpack tax” on outdoor gear (e.g., hiking gear, tents, binoculars, etc.) and use the proceeds to fund conservation.

Items were recoded to create four binary outcome variables indicating “support” or “oppose” for each policy category. Responses were combined such that “somewhat support” and “strongly support” became one category coded as a (1) to indicate support, while “strongly oppose,” “somewhat oppose,” and “neutral” responses were coded as (0) to indicate responses that were not in support of the proposed policies. Neutral responses were assumed to align more with

oppositional responses in that both categories reflect the absence of support for a given policy option.

Covariates hypothesized to be associated with support for conservation policies included membership in a stakeholder group (hunter or wildlife watcher), wildlife value orientations, cognitive behavioral antecedents (e.g., social norms, efficacy), natural and civic place attachment, past engagement in stewardship behaviors, recreation specialization, knowledge of conservation funding mechanisms, membership in a conservation organization, and socio-demographic characteristics. Confirmatory factor analysis supported the previously validated two-dimensional wildlife value orientation scales achieving high internal consistency (as measured by Cronbach's alpha) with domination ($\alpha = 0.73$) and mutualism ($\alpha = 0.80$) as two ends on a spectrum of wildlife beliefs (Fulton et al., 1996; Manfredo et al., 2009). I used 13 items from scales adapted from previous studies of wildlife value orientations. Items were presented as belief statements from 1 (strongly disagree) to 5 (strongly agree). Items were averaged to create a continuous composite index on the original 1-5 scale for each wildlife value orientation.

Social norms refer to societal pressure for individuals to conform (or deviate) relative to others to commonly accepted modes of behavior, which guides individual actions. One item was presented as a belief statement from "strongly disagree" (5) to "strongly agree" (1) to assess the extent to which respondents perceive others in their local community to act in ways that benefit the environment: "*Most people in my local community engage in activities that help protect the natural environment*" (Larson et al. 2018). Efficacy refers to the extent to which an individual controls their actions and perceives the outcome of their behavior. Environmental efficacy was measured with a single indicator adapted from Oreg and Katz-Gerro (2006), asking respondents

to rate the extent to which they agree or disagree with the statement, "*There is no point doing what I can for the natural environment unless others do the same.*" Both items were recoded as binary variables for inclusion in regression models.

I divided sense of place into two measures reflecting natural and civic place attachment (Scannell and Gifford 2010). Based on confirmatory factor analysis, I used a unidimensional natural place attachment scale ($\alpha=0.88$) to measure the extent to which recreationists were attached to the primary place where they recreate. I used four items to measure civic place attachment (i.e. social capital) based on involvement in local community activities and interactions with neighbors to reflect the extent of social ties, providing an affective dimension of social capital ($\alpha=0.84$). Items were presented as belief statements on a 5-point scale from “strongly disagree” (1) to “strongly agree” (5). Responses were averaged to construct composite indices where higher values reflect greater place attachment/social capital and lower values indicate less.

Past engagement in stewardship activities was measured as a set of pro-environmental behaviors adapted from previous research (e.g., Cooper et al., 2015; Larson et al., 2018) to reflect the wildlife conservation context of this study and presented as behavioral statements assessing the frequency with which respondents participated in various stewardships activities in the past five years on a five point scale: never (1), rarely (2), occasionally (3), often (4), or very often (5). My unidimensional scale included eight items ($\alpha=.85$) and averages were computed for each respondent to create a continuous composite index where higher totals (on a scale of 1-5) indicate more frequent engagement in stewardship activities and lower totals indicate less frequent involvement.

Additionally, I included a variable to gauge awareness of current conservation funding mechanisms. Several options were presented, along with the most accurate statement, "*Funds from the sale of hunting and fishing licenses and equipment*," and a binary variable was created to indicate a correct answer (1), or incorrect answer (0). Membership in a conservation organization was measured as a binary variable, where (1) indicated the respondent belongs to an international, national, or local conservation or environmental organization, land conservancy, hunting-related organization, or birding/wildlife watching organization, while (0) indicates that they do not.

A specialization construct was measured using seven items representing respondent behavior, skill, commitment, and centrality to lifestyle of their primary recreational activity ($\alpha=.80$). Items were combined and summed into a specialization index on a scale from 10-44 with higher values reflecting greater levels of specialization.

Socio-demographic information was collected from respondents, including age, sex, ethnicity, income, education, type of residence, and region of the state, and included as control variables in regression models and cluster analysis. Age, income, and education are continuous variables, while gender, type of residence, and region of the state were coded as dichotomous dummy variables. The reference category for each binary demographic variable is indicated in Table 3.2. Ethnicity was not included as a category for analysis due to the predominately homogenous sample of respondents indicating a white/Caucasian ethnic background (91%), and 6% of respondents choosing the "no response" option.

Data analysis procedures

I conducted all statistical analyses using Stata 14 statistical software (StataCorp 2015). I presented descriptive statistics to compare overall support for various conservation policy

options and utilized chi-square independence tests to assess significant differences in conservation policy support between hunters and wildlife watchers. I assessed bivariate correlations (Pearson's r) and Variance Inflation Factors (VIF) values to check for multicollinearity among predictor variables in my regression models (mean VIF = 1.41; Pearson's $r < .6$). I used four binary logistic regression models with each policy as a dependent variable and hypothesized covariates included as independent variables to account for the effect of social-psychological, place-based, and behavioral constructs on stakeholder support for conservation funding policies. Additionally, I performed a k-means cluster analysis to segment respondents according to their patterns of responses to the conservation funding policies presented in the survey and explore associated typologies that may be meaningful for wildlife managers and policymakers.

Results

Respondent demographics

Of those in my overall sample ($n=3500$), 73% identified primarily as hunters ($n=2558$) and 27% as wildlife watchers ($n=942$). Respondent age was skewed toward older age groups. The greatest proportion of respondents for both groups was in the 50+ year age range and a mean age of 55 years for hunters and 59 years for wildlife watchers. Hunters were predominantly male (92%), while wildlife watchers were represented by more females (60%) than male (37%) respondents. Both groups reported to be mostly from a white ethnic background (91%) and tended to be college-educated (62%), although wildlife watchers had a greater proportion of post-baccalaureate degrees (27%) than hunters (14%). The most common residential context for hunters (41%) and wildlife watchers (42%) was in suburban or small towns, while more hunters (35%) were from rural areas than wildlife watchers (28%).

Exploring stakeholder support for conservation funding policies

Support for conservation policies varied by policy type (Figure 3.1). Reallocation of sales taxes or lottery proceeds to fund conservation strategies received greater support than expanding the existing "user-pay" model. The idea that extractive industries who profit from natural resources should contribute a portion of their annual revenue to conservation received the highest support, with 88% somewhat supporting or strongly supporting the proposition and only 12% responding neutral or opposed. A user-based tax was evaluated to gauge support for a tax on general outdoor gear (i.e. a "backpack tax") and proceeds earmarked for fish and wildlife programs (similar to the allocation of Pittman-Robertson funds). This idea received evenly split support, with 42% of respondents opposing or strongly opposing the idea and 41% in somewhat or strong support. The number of respondents "strongly opposed" to a backpack tax was much higher than the other three policies at nearly 27%; 17% reported being neutral on the idea of a backpack tax. The two policies assessed that would provide funds reallocated from state sales taxes or lottery proceeds received relatively strong support, with 72% and 77% in support, respectively. 12% somewhat or strongly opposed the sales tax option, while 13% opposed the lottery proceeds option, with 17% and 11% neutral respectively.

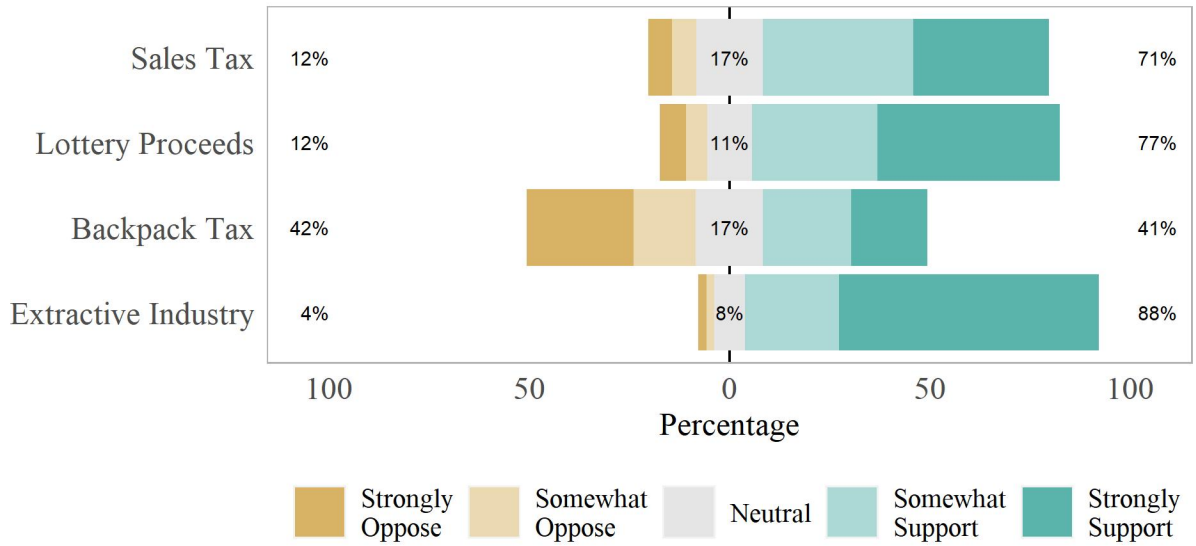


Figure 3.1: Support for conservation funding policies (%).

Differences emerged when I compared support among the two stakeholder groups surveyed (Table 3.1). Hunters supported the extractive industry policy (86%), but not as strongly as wildlife watchers (93%) ($X^2=37.4, p<.001$). Hunters were also more likely to oppose reallocation of sales tax revenue, with 32% opposed compared to 22% of wildlife watchers ($X^2=31.4, p<.001$). Wildlife watchers supported the lottery proceeds option slightly more than hunters (80% vs. 75%) ($X^2=37.4, p<.001$). Hunters were slightly more supportive of a backpack tax (42%) than wildlife watchers (37%) ($X^2=7.77, p<.01$). When I compared awareness of conservation funding mechanisms, 87% of hunters correctly identified revenue from the sale of hunting licenses and equipment as the primary source of conservation funding, compared to only 51% of wildlife watchers ($X^2=526.2, p<.001$).

Table 3.1: Support and opposition to conservation policies by stakeholder group (%).

Policy	Hunters	Wildlife Watchers
	Support Oppose	Support Oppose
Sales tax	68% 32%	78% 22%
Lottery	75% 25%	80% 20%
Backpack tax	42% 58%	37% 63%
Extractive industry	86% 14%	93% 7%

Binary logistic regression results show how the odds of supporting the given policy (backpack tax, lottery, sales tax, or extractive industry) change based on the associated covariates (Table 3.2). Coefficients in logistic regression are log odds which are typically converted to odds ratios for easier interpretation. Odds ratios describe the change in the likelihood of the binary outcome associated with a one-unit change in continuous predictor variables and compare the odds of the binary outcome at two different levels for categorical predictor variables (Hosmer et al. 2013). Therefore, I interpret the odds ratios in terms of overall statistical significance and draw comparisons between models based on patterns observed in the independent variables.

Descriptive analysis and chi-square tests suggested that hunters and wildlife watchers differ significantly in their support for conservation funding options. However, when accounting for the effects of other covariates, participation in hunting or wildlife watching did not have a statistically significant influence on stakeholder support. Regression results indicate that no variables were significantly associated with support or opposition across all four conservation funding policies presented, although several variables were associated with three out of four policies. Odds ratios >1 indicated that more frequent involvement in stewardship activities is associated with increased odds of supporting the backpack tax, sales tax, and extractive industry options. Belonging to a conservation organization did not significantly influence support for any of the policies, and knowledge of conservation funding mechanisms only affected (increased) support for the backpack tax.

Mutualistic value orientations positively influenced support for three policies: lottery proceeds, sales tax, and extractive industry revenue. A domination orientation toward wildlife was associated with decreased odds of supporting the sales tax and extractive industry policies. Attachment to one's primary recreational area was only associated with support for the sale tax.

Conversely, social capital was associated with decreased odds of supporting three policy options: backpack tax, lottery proceeds, and sales tax. However, closely related to the idea of social capital are descriptive social norms or the perception that others in one's local community are engaged in actions to help protect the natural environment. Social norms were positively associated with the lottery and sales tax options, indicating increased odds of supporting those policies when one perceives others in the community as taking pro-environmental actions. However, neither environmental efficacy nor specialization were measurably associated with any of the conservation funding policies.

Demographic variables exhibited varying degrees of predictive influences on support for conservation policies. Age was negatively associated with lottery and sales tax options, indicating that older respondents were less supportive of those particular conservation funding mechanisms. Gender was significantly associated with degree of support for lottery and backpack tax policies, yet the relationship differed for each. Relative to the reference class *male*, those who identified as female, non-binary, or other had decreased odds of supporting a backpack tax and increased odds of supporting the lottery proceeds option. Education positively influenced support for backpack tax and sales tax options. Neither type of residence (rural, suburban, or urban) nor region of the state of Michigan were significantly associated with support for any of the four conservation funding policies. Hosmer-Lemeshow and Pearson chi-square goodness of fit statistics show p-values above the 0.05 cutoff, indicating that the models fit the data well.

Table 3.2: Binary logistic regression results (β coefficients presented as odds ratios).

Variable	Backpack Tax	Lottery	Sales Tax	Extractive Industry
Attitudinal variables				
Values				
Mutualistic orientation	1.09	1.54**	1.72**	1.70**
Domination orientation	0.91	1.03	0.78**	0.64**
Social norms	0.88	1.28*	1.38**	1.00
Environmental efficacy	0.83	1.22	0.91	1.25
Place-based variables				
Recreational place attachment	1.08	1.11	1.19**	0.94
Social capital	0.86**	0.80**	0.80**	0.86
Behavioral variables				
Stewardship engagement	1.77**	1.11	1.43**	1.42**
Specialization	0.99	1.02	1.02	1.01
Stakeholder group (<i>ref. hunter</i>)	0.78	0.85	1.11	1.23
Contextual variables				
Knowledge of conservation funding	1.34**	1.08	0.95	1.18
Conservation org member	1.10	1.17	1.07	1.03
Residence (<i>ref. rural</i>)	1.05	1.11	1.07	1.12
Socio-demographics				
Age	1.00	0.98**	0.98**	1.00
Gender (<i>ref. male</i>)	0.69**	1.56**	0.89	0.93
Education	1.11**	0.98	1.11*	0.99
Income	0.93*	1.00	1.04	0.93
Region of Michigan (<i>ref. southern MI</i>)	0.96	0.89	0.85	0.86
Constant	0.20**	1.06	0.39	6.30
Model summary (goodness of fit)				
McFadden's R^2	8%	5%	10%	9%
Hosmer-Lemeshow χ^2	$p=0.18$	$p=0.29$	$p=0.74$	$p=0.37$
Pearson χ^2	$p=0.41$	$p=0.54$	$p=0.34$	$p=0.17$
Classification accuracy	62%	77%	74%	88%

* Significant at 95% confidence level

** Significant at 99% confidence level

Hierarchical clustering using Ward's linkage identified an optimal number of clusters (3) by iteratively minimizing the distance to the mean of each cluster from the individual data points in that cluster. A k-means cluster analysis was performed to segment respondents into three clusters according to their support for conservation policies. Cluster analysis revealed three homogenous groups related to conservation policy support: 'strong support,' 'mixed/opposed,' and

'anti-backpack tax' (Figure 3.2). The respondents in these groups were more similar to each other in their patterns of responses to policy support variables than they were to respondents in other clusters.

Respondents in the 'strong support' cluster comprised 36% of the sample and generally somewhat or strongly supported all four policy options. Regarding the backpack tax, which was the least supported option for the entire sample, the 'strong support' cluster exclusively somewhat or strongly supported the option, with zero respondents reporting neutral or opposed responses. The 'anti-backpack tax' cluster comprised 43% of respondents, all of whom somewhat or strongly opposed the backpack tax option (with 29% neutral) while generally supporting the other three options. No one in the 'anti-backpack tax' cluster supported the backpack tax option. Respondents in the 'mixed/opposed' cluster comprised 21% of respondents; a greater proportion of this cluster opposed policies than supported, except for the extractive industry-based option, and had a higher proportion of 'neutral' responses to all four policies.

One-way analysis of variance (ANOVA) for continuous variables and chi-square tests for categorical variables indicated several associations between respondent clusters and covariates (Table 3.3). Respondents in the 'strong support' cluster were more likely to have engaged in stewardship behaviors (Mean = 2.98), a higher percentage were aware of conservation funding mechanisms (81%), and 67% reported being a member of a conservation organization (Table 4). Those in the 'strong support' cluster were slightly more mutualistic in their value orientation toward wildlife (Mean = 3.59) than the 'mixed/opposed' cluster (Mean = 3.07). They also had the highest proportion of respondents in the <40 age range (15.8%) and were more likely to have a Bachelor's (33%) or graduate/professional (20%) degree.

Respondents in the 'anti-backpack tax' cluster were similar on many variables to the 'strong support' cluster, with two notable exceptions: 'anti-backpack tax' cluster respondents were less likely to report being a member of a conservation organization (55% vs. 67%) or correctly identify current conservation funding mechanisms (74% vs. 81%). The 'mixed/opposed' cluster was slightly less mutualistic and more utilitarian in their perspectives and value orientations toward wildlife than the 'strong support' or 'anti-backpack tax' clusters. They were slightly less engaged in stewardship activities than the other two clusters (Mean = 2.24) and were the least likely group to report membership in a conservation organization at only 46%. The 'mixed/opposed' group also had the highest proportion of male (82.3%), middle-aged (40-64; 65.6%), and rural (34.5%) respondents, though type of residence (urban/rural) and region of the state were not statistically significant.

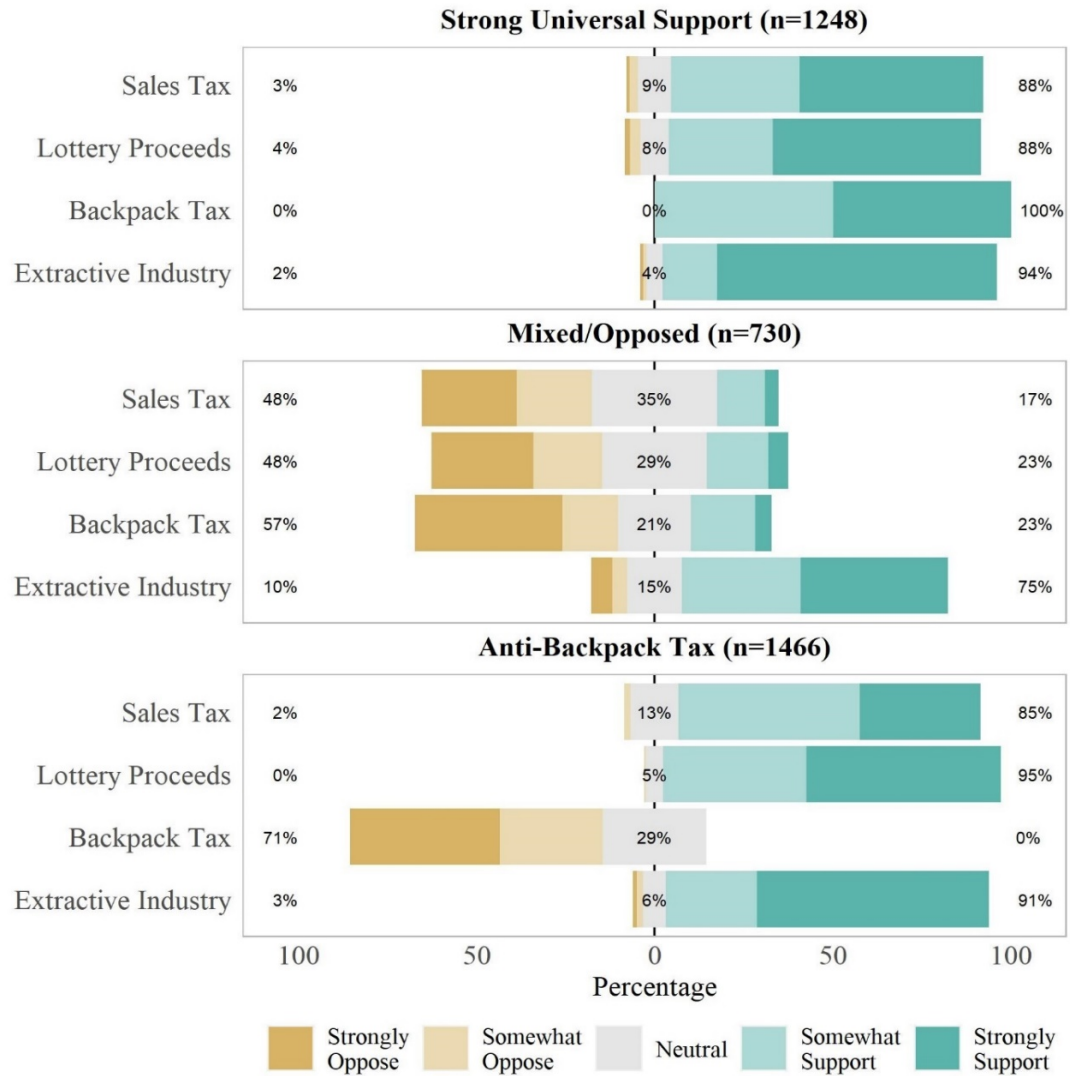


Figure 3.2: Conservation funding policy support by cluster (%).

Table 3.3: Characteristics of each respondent cluster (mean value for continuous, % for categorical variables).

Variable	Strong Support	Mixed/ Opposed	Anti-Backpack Tax
Attitudinal variables			
Values (1-5 scale)			
Mutualistic orientation**	3.59	3.07	3.59
Domination orientation**	3.47	3.72	3.47
Social norms (%)	32.9	31.5	34.8
Environmental efficacy (%)	93.3	91.1	92.0
Place-based variables (1-5 scale)			
Recreational place attachment**	3.89	3.78	3.88
Social capital**	3.31	3.43	3.33
Behavioral variables			
Stewardship engagement (1-5 scale)**	2.98	2.42	2.60
Specialization (10-44 scale)**	37.1	35.8	36.2
Stakeholder group (%)**			
Hunter	74.7	79.2	68.9
Wildlife Watcher	25.3	20.8	31.1
Conservation organization membership (%)**	66.7	45.9	55.3
Contextual variables			
Knowledge of conservation funding (%)**	80.9	78.5	73.9
Residence (%)			
Urban	25.7	23.4	24.1
Suburban	41.0	40.2	41.1
Rural	32.1	34.5	33.5
Socio-demographics			
Age (%)**			
<40	15.8	7.0	12.6
40-64	53.6	65.6	61.7
65+	30.5	27.4	25.8
Gender (%)**			
Male	80.4	82.3	72.8
Female	17.3	14.0	23.7
Education (%)**			
Less than Bachelor's degree	32.1	38.9	37.8
Bachelor's degree	33.0	30.0	29.0
Graduate/professional degree	20.3	16.7	17.8
Income			
<\$75k	36.6	39.2	40.9
\$75k - \$100k	23.3	21.4	19.2
\$100k+	40.1	39.4	39.9
Region of Michigan (%)			
Southern lower peninsula	45.6	42.5	46.2
Northern lower peninsula	41.1	41.8	40.9
Upper peninsula	13.4	15.7	12.9

* Significant at the 95% level (ANOVA for continuous and chi-square for categorical data).

** Significant at the 99% level (ANOVA for continuous and chi-square for categorical data).

Discussion

Results of my study revealed that support exists for alternative wildlife conservation funding policies among key wildlife-associated stakeholder groups, which could lead to a broader suite of options available for funding conservation in the future. Support was greatest for the extractive industry option, followed by sales tax and lottery proceeds options, with a user-based tax (i.e. a backpack tax) being the least supported conservation funding option. Determinants of support, however, varied by type of policy and stakeholder characteristics. The results of my analysis suggest that wildlife-associated recreationists are heterogeneous in their values, behaviors, and willingness to engage in stewardship through pro-environmental behaviors. I found no measurable differences in support for the four conservation funding policies between hunters and wildlife watchers when accounting for other variables. Despite a traditional separation of hunters and wildlife watchers into a “consumptive versus non-consumptive” dichotomy, my research aligns with a view that they are more alike than different in their motivations, values, and conservation involvement (Kellert, 1978; Teisl & O’Brien, 2003; Cooper et al., 2015; Larson et al., 2018).

Contrary to expectations, I did not find an association between specialization and support for conservation funding policies. Previous studies highlighted the roles of activity specialists in supporting management actions and involvement in conservation (Cole & Scott, 1999; Hvenegaard, 2002; Schroeder et al., 2006; Oh & Ditton, 2008), however, the hypothesis that greater specialization in hunting or wildlife watching would be related to support for conservation policies was not supported by this analysis. Similarly, the influence of demographic variables exhibited inconsistent and weak relationships with conservation policy support. Younger age was associated with support for sales tax and lottery proceeds options, but the effect

was small. Previous studies suggested that women are more mutualistic in their value orientations and often support management actions designed to protect wildlife (Vaske et al., 2001; Schroeder et al., 2006; Teel et al., 2010; Hermann et al., 2013). My findings, however, indicated that relative to males, people who identify as female, non-binary, or other were less likely to support the backpack tax, yet more likely to support the lottery proceeds option. Educational attainment was positively associated with support for the backpack tax and sales tax. Interestingly, I observed that income was negatively associated with support for the backpack tax. One of the primary arguments against such a tax is that it would present an unfair burden to lower income recreationists (Outdoor Industry Association, 2017).

My results were similar to those of Mangun and Shaw (1984), Kellert et al. (2017), and Larson et al. (2021) in finding general opposition to new user-based tax options for conservation funding, and greater support for industry and state-based tax options. However, these findings differed from Dalrymple et al. (2012) who found preferences for user-based taxes for non-game conservation funding. This difference might be attributed to my survey sample population. People tend to oppose new policies that they perceive to have a high personal cost (Caplan, 2011), and generally want to shift the burden on to other groups. A sample of wildlife recreationists may be likely to favor general sources of taxation over specialized user-based taxes, while the general public may be more inclined to believe that fairness dictates that specialized users (e.g., wildlife-associated recreationists) should pay the costs of wildlife conservation (Dalrymple et al., 2012).

Perceptions of tax proposals among the public and the political mechanisms through which ideas are translated into legislation are complex (Loomis & Mangun, 1987). Most respondents (59%) opposed expanding the current user-pay system to include additional taxes on

outdoor gear, and significant opposition exists in the private sector (Outdoor Industry Association, 2017). It may simply be more politically palatable to reallocate conservation funding from existing sources, such as state sales taxes or lottery proceeds, than to impose new taxes on the public or specific users. Generalized sources of taxation already exist, and reallocating revenue from those sources received substantially more support than the expanded "user-pay" model represented by the backpack tax option. Reallocation of funds from state sales taxes or lottery proceeds received 71% and 76% support in our survey, respectively. Several states, such as Missouri, Arizona, and Arkansas have applied this approach to conservation funding with varying levels of success (McKinney et al., 2005).

My findings further underpin the variability of perspectives on taxes, particularly among our 'mixed-opposed' cluster who strongly supported the industry-based policy but opposed the other three options. Further information regarding implementation and expected effects of particular policies might resonate with respondents in the 'mixed/opposed' cluster. Respondents with mixed or moderate positions may not have solidified their perspectives on policies and may be more likely to shift attitudes based on outreach and educational efforts designed to communicate the context and expected impact of management proposals (Campbell & Mackay, 2003; Vaske & Needham, 2007).

A third approach was favored by nearly 88% of respondents: institute a tax on extractive industries who profit from natural resources and allocate a portion of their annual revenue to pay for conservation efforts. This is reminiscent of other programs, such as the Land and Water Conservation Fund (LWCF) and Michigan's Natural Resources Trust Fund (MNRTF), that have provided funds for conservation initiatives by apportioning revenue from extraction and development of natural resources like timber, oil, and gas. The LWCF is a federal program

enacted in 1965 (and permanently reauthorized in 2020 as part of the Great American Outdoors Act) that provides funds for recreational access and infrastructure projects using royalties from offshore oil and gas development (Echols et al., 2019). The MNRTF is a state-based program that takes revenue from natural resource extraction in the state of Michigan and distributes grants to local and state entities for a wide variety of parks and recreation improvement projects (MDNR, 2015). Industry-based funding models enjoy high levels of public support (e.g., Kellert et al. 2017, Larson et al. 2021) and fish and wildlife interests have capitalized on that support with the introduction of Recovering America's Wildlife Act (RAWA) (Recovering America's Wildlife Act, 2021) in the United States Congress in 2021. Although bipartisan support exists for RAWA, it's future is uncertain at this time.

Regression and cluster analyses revealed the importance of understanding the influence of stewardship behaviors (Cooper et al., 2015), values (Fulton et al., 1996; Manfredo et al., 2018) and normative and place-based influences (Larson et al., 2018) on likelihood to support conservation funding policies. Engagement in stewardship actions was positively associated with support for the backpack tax, sales tax, and extractive industry options. Presumably, those more engaged in stewardship activities, such as participating in habitat improvement projects, volunteerism, or donating to conservation causes, have a greater likelihood of being exposed to conservation policy issues, which may predispose them to support initiatives designed to provide increased funding (Zaradic et al., 2009; Cooper et al., 2015). Regression analysis indicated knowledge of conservation funding mechanisms is a unique characteristic of support for the backpack tax; it was not associated with any other conservation policies, suggesting that increased awareness of funding mechanisms and highlighting the connections between users

(e.g., hunters, wildlife watchers) and the resource (e.g., wildlife) might lead to greater support for user-based taxes.

Engagement in stewardship actions and knowledge of conservation funding might be facilitated through membership in conservation organizations. Most hunters (87%) in my sample were aware that conservation funding currently depends on the sale of hunting licenses and equipment, while nearly half as many wildlife watchers had that knowledge. Since both groups reported belonging to various conservation organizations at similar rates, organizations focused on wildlife watching (e.g., birdwatching, wildlife photography) may benefit from incorporating educational messaging about the importance of wildlife conservation and the mechanisms that enable continued protection of wildlife species and habitats that are necessary to sustain wildlife-associated recreation (Kusmanoff et al., 2020). However, accounting for the influence of other covariates, membership in a conservation organization did not influence support for any of the four policies.

Mutualistic value orientations increased the odds of supporting the sales tax, lottery proceeds, and extractive industry options, but not the backpack tax. Domination value orientations decreased the odds of supporting the sales tax and extractive industry options. Since those with mutualistic wildlife value orientations tend to favor protectionist perspectives and attitudes toward wildlife and nature, they may be more inclined to support policies because they perceive them as having an overall positive ecological effect (Rhodes et al., 2017). The negative association between domination value orientations and sales tax and extractive industry policies might be attributed to traditionalist or utilitarian world views reflected by use-oriented values. Traditionalists tend to focus on individual rights, economic development, and human uses of

wildlife, and may be more likely to oppose ideas that they perceive as running counter to those values (Inglehart, 1995).

Although sense of place is important to the formation of environmental concern and participation in pro-environmental behaviors (e.g., Halpenny 2010, Lee 2011, Buta et al. 2014, Gifford and Nilsson 2014, Siemer et al. 2017, Larson et al. 2018), place-based variables in regression models were either not significant or had the opposite hypothesized effect. In the case of civic place attachment (Scannell & Gifford, 2010), I found that more extensive community networks and involvement in community activities decreased the odds of supporting three of the four policies (extractive industry revenue being the exception). This effect might be attributed to the community context through which social capital develops, and types of social connections developed through civic involvement (Peterson et al., 2006). Associations between natural place attachment and pro-environmental behaviors, but not civic place attachment, have been previously observed (Scannell & Gifford, 2010). Moreover, it is possible that individual-level measures do not adequately capture the multilevel nature of the social capital construct (Cho & Kang, 2017).

Another feature of collective social influence (i.e., social norms), however, did positively influence support for lottery proceeds and sales tax policy options. When individuals perceive their friends and neighbors to act in environmentally friendly ways, they may be more inclined to follow suit which could include supporting policies that benefit wildlife and conservation (Stern et al., 1999; Gifford & Nilsson, 2014; Steg, 2016). More comprehensive measures of natural place attachment and the various types of social capital may reveal the importance of emotional and symbolic affiliation with places and the ways in which sense of place motivates efforts to protect nature.

The inability to adapt institutional structures and expand funding models to be responsive to a greater diversity of expectations and interests in wildlife may reflect political barriers to implementation more so than lack of public support. Public buy-in, however, is a necessary antecedent to conservation approaches that provide benefits for stakeholders, communities, and wildlife (Muhumuza & Balkwill, 2013). A backpack tax appears to be a polarizing proposition; everyone in the ‘strong support’ cluster somewhat or strongly supported it, while everyone in the ‘anti-backpack tax’ cluster opposed it or were neutral. The nature of opposition to a backpack tax or other user-based taxes may be in part due to well-organized efforts by special interests (e.g., outdoor industry, equipment manufacturers) to oppose political strategies that might increase their costs. Groups that can exert political power over economic and social policy may have an inordinate influence over conservation funding strategies, even if public opinion can be swayed to support various user-based funding approaches (Galbraith, 2017). By understanding the forces driving opposition to user-based taxes and fees and finding ways to communicate the positive outcomes for wildlife that such approaches have enabled in the past, wildlife administrators and policymakers could secure needed support for expanding user-pay models to include a greater diversity of outdoor interests (Regan, 2010).

This study’s findings further underscore the sentiment among wildlife stakeholders that companies who profit from natural resource extraction should reinvest some of their revenue to improve wildlife habitat and the natural environment for public benefit. Responses to tax-based funding options, whether applied to the general public or specific user groups, are typically more variable. In general, support for increased funding for wildlife, conservation, and nature programs remains high across broad demographic and political segments of the public (Kellert et

al., 2017), but the particular details of funding proposals, combined with political and organizational barriers, present difficult pathways to implementation (Jacobson et al., 2007).

Limitations and future research

Several limitations affect the generalizability of these findings. First, my sample comprises individuals in the MDNR e-mail database and likely are not representative of the general population of Michigan or broader geographic areas. Inferences should be limited to the population from which the sample was drawn. Second, the conservation funding options presented are not exhaustive and reflect choices based on space and time limitations of the survey. Other strategies to increase funding for conservation efforts are evolving and continue to be discussed on global, national, state, and local scales. For instance, I did not investigate voluntary programs such as specialized license plates, tax checkoffs, or conservation stamp purchases. These types of voluntary programs have been assessed in the past, and although they typically have high levels of support, they are generally inadequate to generate the level of sustainable funding needed for conservation (Mangun and Shaw 1984). Third, no information was provided to respondents regarding the potential implementation of the policy options or the expected impacts on conservation funding. Support may be context-dependent and vary based on how the policy options are defined and communicated to the public. Additionally, my research design captured a cross-sectional snapshot of citizen support for specific policies; given the dynamic nature of politics, further research may benefit from longitudinal designs or choice experiments that measure how respondents weigh trade-offs and alternatives or how levels of support change over time in response to new information and social norms. Low R^2 values in regression models indicate that I did not adequately measure all factors that account for variance in conservation policy support. Future research could strengthen my model by incorporating

other potential covariates (e.g., trust in institutions, political ideology, environmental attitudes, etc.) to create a more comprehensive framework for assessing and predicting conservation policy support. Finally, the data for this study were collected during the COVID-19 pandemic of 2020. It is currently not known how the unprecedented situation may have influenced peoples' responses to surveys.

Conclusions and recommendations

My study suggests that public support exists for alternative conservation funding mechanisms among Michigan hunters and wildlife watchers. Despite public support for strategies that expand funding for conservation programs, political barriers exist to implementation. Special interests often leverage their political capital and organizational networks to influence decisions that may not always align with public trust thinking and equitable governance of wildlife resources. The role of state wildlife agencies in overcoming political barriers may appear limited, as most policy decisions are made by trustees, including legislatures, boards, and commissions. State wildlife agencies and managers, however, often interface with the public and help shape public perceptions, including support for wildlife conservation.

Novel avenues for stakeholder involvement in policymaking might ensure that the interests of broader publics are incorporated into decisions. State wildlife agencies that emphasize expanding institutional capacity for partnerships and facilitating involvement in conservation through various organizations might enable greater stakeholder involvement and support. Public-private partnerships are one conduit through which multiple sectors of conservation and wildlife interests may be able to bring collective organizational and political influence to bear on conservation decisions. Education, networking, and outreach can prioritize

conservation-oriented messaging and bring awareness to the benefits that wildlife conservation provides the public, whether they engage in wildlife-associated recreation or not. Achieving a high level of public support for a policy does not ensure implementation, suggesting that a diversity of mechanisms might be necessary to broaden the scope of conservation funding strategies and utilize the support of beneficiaries to help inform the recommendations made by state wildlife agencies to trustees and policymakers.

CHAPTER 4: STRUCTURAL PATHWAYS TO PRO-ENVIRONMENTAL BEHAVIOR: NATURE-BASED RECREATIONISTS AND THE ROLE OF VALUES AND MOTIVATIONS

Abstract

Knowledge of recreationist characteristics and their relationship to pro-environmental behavior (PEB), provides natural resource managers with information to anticipate the needs of stakeholders, provide services, adapt to a changing social landscape, and mitigate negative environmental impacts. A growing body of research has considered the complex links between nature-based recreation participation and engagement in PEB, with varying degrees of success. Much uncertainty still exists in identifying models of behavior that consistently predict PEB and can be applied in diverse management contexts. This study tests the hypothesis that wildlife-related values, place-based variables, and specialization interact with recreational motivations to affect engagement in PEB. I used structural equation modeling to test hypothesized relationships using a survey sample of 9572 nature-based recreationists from Michigan, USA. I found that wildlife value orientations successfully predicted three dimensions of recreational motivations: *Nature*, *Achievement*, and *Social*. *Place attachment* and *Specialization* both had a positive direct effect on PEB, as well as indirectly through the three motivational dimensions. *Nature* and *Social* motivations were significantly associated with engagement in PEB, indicating that knowledge of recreational motivations and values can help predict who will act in pro-environmental ways and design strategies to facilitate stewardship of natural resources. Overall, my results may enable public land managers to better understand the factors that influence engagement in PEB among nature-based recreationists, thus helping to increase participation and build broad support for conservation measures.

Introduction

Concerns about water and air pollution, climate change, population growth, ecological degradation, species extinction, and wildlife habitat loss have led to global efforts to emphasize conservation priorities that protect wildlife species and habitats. A key component of strategies that protect ecosystems involves connecting people to nature through nature-based tourism under the presumption that direct experiences in nature will foster an environmental ethic among the public (Kareiva, 2008). Outdoor recreation is an increasingly popular mechanism for involvement in nature-based leisure activities, and public lands managers are often tasked with providing recreational experiences that meet a diversity of preferences and expectations (Driver, 2008; Kil et al., 2014). An implicit assumption underlying these efforts is that nature-based experiences lead to higher attachment to nature and people are more likely to care for and preserve places and things they are familiar with and care about; therefore, facilitating experiences in nature may lead to greater support for conservation strategies that preserve wildlife, habitat, and access to outdoor recreation opportunities (Zaradic et al., 2009).

Further, experiences in nature through nature-based outdoor recreation may encourage engagement in pro-environmental behaviors (PEB), or behaviors that “generate positive environmental impacts, promote environmental quality, and result in sustainable use of natural resources” (Cooper et al., 2015:446). In particular, types of PEB that result in positive conservation outcomes for wildlife habitat and result in public support for conservation efforts are of interest to wildlife managers and conservation advocates. Knowledge of motivations for visiting natural areas may help managers provide benefits that optimize the nature-based recreation experience (Driver, 2008; Kil et al., 2014). Moreover, an understanding of the various social, psychological, and demographic characteristics of public lands users may help to connect

nature-based recreationists with stewardship opportunities that provide support for conservation of wildlife and wildlife habitat (Cooper et al., 2015).

However, recreationists are not a homogenous group; they vary in their preferences, values, attitudes, motivations, the meanings they attach to recreational experiences, and the benefits they hope to achieve (Williams et al., 1992; Bright & Porter, 2001; Teisl & O'Brien, 2003; Needham et al. 2007). Values and motivations have been proposed as important constructs mediating engagement in PEBs for nature-based recreationists (van Riper et al., 2020). Values form the basis of a cognitive hierarchy and are generally thought of as guiding principles through which people develop attitudes and beliefs toward specific objects or concepts (Fulton et al., 1996). Motivations refer to the outcomes and experiences people expect to gain from participation in outdoor recreation activities (Driver & Tocher, 1970). Additionally, values and motivations may work in conjunction with emotional or symbolic meanings attached to places and place-based experiences in nature to facilitate actions that protect highly valued landscapes (Walker & Ryan, 2008; Larson et al., 2018).

Empirical research has established that the relationship between nature-based recreation and PEB is complex. The interconnected nature of variables influencing PEB makes structural equation modeling (SEM) an ideal method for examining relationships between latent constructs in the context of nature-based recreation. SEM allows researchers to look for causal influences and mediating variables by modeling multiple independent and dependent variables simultaneously and quantifying the strength and direction of influence (Bollen & Long, 1992). Using a survey of nature-based recreationists in Michigan, I employed SEM methodology to model the relationships between participation in nature-based recreation and engagement in PEB based on social, psychological, behavioral, and place-based constructs.

Few studies have investigated the role of values and motivations together in models of PEB (van Riper et al., 2020). The objectives of this chapter were to: (1) investigate the hypothesized causal factors that affect engagement in PEB by nature-based recreationists using structural equation modeling (SEM); (2) determine the extent to which wildlife-related value orientations and recreational motivations influence engagement in PEB, and (3) identify implications of this research for wildlife management practitioners and outline opportunities for engagement with nature-based recreationists to increase support for conservation efforts.

Background

Investigating pro-environmental behavior

I examined individual level pro-environmental behaviors (PEB) by nature-based recreationists in this chapter based on established cognitive and social-psychological conceptual frameworks (Homer & Kahle, 1988) to investigate the linkages between wildlife value orientations, recreational motivations, place-based variables, specialization, and engagement in PEB. It has been proposed that outdoor recreation involvement can increase awareness of environmental problems and motivate behaviors and commitments to environmental protection (Tarrant & Green, 1999). Nature-based recreationists represent a potentially important group of stakeholders for managers and practitioners who wish to encourage stewardship of natural resources among the public. Research suggests that understanding barriers to environmental action through the lens of behavioral antecedents can enable more effective interventions aimed at overcoming those barriers (Steg & Viek, 2009).

It is generally assumed that nature-based recreationists hold positive environmental attitudes and are more likely to support conservation and management actions, yet research efforts to examine the linkages between participation in nature-based recreation and

environmental attitudes have found inconsistent or weak associations (Van Liere & Noe, 1981; Theodori et al., 1998). Dunlap and Heffernan (1975) first tested the assumption that an empirical connection exists between outdoor recreation participation and positive environmental attitudes, and that the association is stronger for “appreciative” than for “consumptive” activities. They found support for this hypothesis, but the effect was weaker than expected, and additional research on Dunlap and Heffernan’s hypotheses found that the effect of recreational involvement is attenuated when accounting for other variables (Geisler et al., 1977; Pinhey & Grimes, 1979). Subsequent studies (e.g., Van Liere & Noe, 1981; Jackson, 1986; Bright & Porter, 2001) continued to evaluate potential associations between participation in appreciative or consumptive outdoor recreation and environmental concern, generally finding weak or inconsistent associations (Theodori et al., 1998; Steg & Viek, 2009).

Several scholars point out that environmental concern and behavior are not synonymous, and often pro-environmental attitudes do not lead to meaningful pro-environmental outcomes (Kil et al., 2014). The need to better understand the processes that lead to environmentally significant behavior was outlined by Stern et al. (1999) and Stern (2000). They argue that several factors contribute to an individual’s engagement in PEB: cognitive/rational factors, normative concerns, emotional or affective qualities, and other contextual factors. Cognitive influences stem from the Theory of Planned Behavior (Ajzen, 1991), which has been used successfully to explain PEB in various recreation contexts, including hunting, birdwatching, and wildlife watching (Hrubes et al., 2001; Daigle et al., 2002; Wilkins et al., 2019). Normative or moral influences on PEB are based on an adapted “norm-activation” model (Schwartz & Howard, 1981) which extends behavioral models to account for the role of altruistic values, social and personal norms, and self-efficacy (Stern, 2000). Together, aspects of Ajzen’s (1991) Theory of

Planned Behavior and Stern's (2000) Value-Belief-Norm Theory appear to partially explain variation in individual-level PEBs and successfully model the social-psychological and cognitive variables that predict engagement in PEBs (Kaiser et al., 2005; Oreg & Katz-Gerro, 2006).

However, cognitive theories alone do not adequately account for the diversity of outcomes related to nature-based recreation or the inconsistent relationship between environmental concern and behavior (i.e., the "value-action gap"). The role of affective constructs has been explored in conjunction with cognitive frameworks to explain environmental attitudes and behaviors more fully (Siemer et al., 2017). Place-based variables are generally thought to comprise an affective or symbolic dimension of behavior that represent emotional attachment to physical locations, often arising through place-based experiences in nature (Larson et al., 2018). Integrative models of relationships between recreation and PEB are beginning to point to the importance of place-based constructs in mediating other significant relationships. The recreational setting is an important component of satisfactory experiences (McCool et al., 1984), and attachment to specific landscapes (and nature in general) may facilitate a sense of obligation to act in environmentally responsible ways (Gosling & Williams, 2010; Scannell & Gifford, 2010; Whitburn et al., 2020).

It may be important to understand the role of place attachment and its interaction with cognitive factors, such as personal values, to understand the context of PEB (Naiman et al., 2021). Emotional and symbolic affiliation with natural, social, and cultural landscapes can lead recreationists to develop a sense of responsibility towards a place and feel a stronger obligation to protect areas that are threatened or degraded (Scannell & Gifford, 2010). Together with socio-demographic variables and other contextual constructs [i.e., specialization (Bryan, 2000)],

cognitive and affective frameworks for assessing individual behavior make up much of the breadth of research on PEB (Oreg & Katz-Gerro, 2006).

Shifting wildlife value orientations

Values are conceptualized as a lens through which individuals evaluate their beliefs and determine their guiding principles, which in turn form the basis for their attitudes and behaviors (Rokeach, 1973; Schwartz, 1992). Values tend to be few in number, formed early in life, and common to members of the same culture or society (e.g. equality, fairness). Although values tend to change slowly and transcend specific situations, attitudes and behaviors are context-dependent and are often quick to change. Attitudes are situational and reflect expectations and beliefs about and the outcomes associated with various behaviors (Stern & Dietz, 1994). Basic beliefs orient one's underlying fundamental values toward more specific objects and situations to help explain the diversity of attitudes and behaviors among individuals with similar fundamental values (Fulton et al., 1996). For example, two individuals with a similar fundamental value "respect for life" might differ in their specific beliefs toward wildlife. One may believe wildlife deserve the same rights as humans and conclude that harming them is wrong in any circumstance, while the other may believe humanely harvesting game preserves the underlying value of respect for life as long as they do not suffer unnecessarily (Teel & Manfredi, 2010). These two hypothetical individuals hold similar values but different value orientations, attitudes, and behaviors toward wildlife.

Value orientations are defined as clusters of basic beliefs that are based on fundamental values but orient one's cognitions toward higher-order attitudes and behaviors (Schwartz, 1992). Wildlife value orientations have been used to identify patterns of beliefs toward wildlife and can be classified along a spectrum from 'domination' to 'mutualism' (Fulton et al., 1996; Manfredi

et al., 2003, 2018). Domination wildlife value orientations emphasize human uses of wildlife (e.g. hunting) while mutualist orientations tend to reflect protectionist perspectives (e.g. wildlife rights). Domination value orientations are most prevalent in the United States and are linked to traditionalist values such as individual rights, using wildlife for human benefit, and utilitarian perspectives on natural resources (Inglehart & Welzel, 2010; Teel & Manfredi, 2010). However, studies have tracked wildlife value orientations over the preceding decades and found that collectively, value orientations have been shifting from domination perspectives to mutualistic perspectives, and these changes are linked to other socio-demographic trends in society, such as urbanization, education, income, and geographic mobility (Inglehart & Baker, 2000; Manfredi et al., 2009). As society continues to modernize, wildlife managers might expect values and value orientations of stakeholders to become more diverse, leading to a broader range of perspectives and expectations for experiences with nature and wildlife.

Motivations for nature-based recreation

A better understanding of the factors that push recreationists to engage in outdoor recreation and the goals they seek by doing so may enable public area managers to create more effective communication strategies, anticipate future stakeholder needs, and increase support for conservation and management actions (Le Corre et al., 2021). Motivations are driven by psychological and sociological desires and expectations that participation in an activity will provide certain benefits or outcomes (e.g., stress reduction, improved well-being, physical health, etc.) (Beard & Ragheb, 1983; Driver, 2008), which are then linked to satisfaction with those experiences when expectations are met (Hendee, 1974; Clark & Stankey, 1979).

Recreation planners and managers are concerned with providing positive experiences for a range of recreationists and mitigating user conflicts and other negative impacts, making

knowledge of motivations an integral component of successful management. Driver & Tocher (1970) developed Recreation Experience Preference (REP) scales to measure expected outcomes associated with outdoor recreation and provide information to planners and managers regarding benefits sought by stakeholders (Manfredo et al., 1996). A meta-analysis by Manfredo and colleagues (1996) showed that REP scales provide a valid and reliable system for measuring leisure motivations, and this theoretical framework yields useful insights into the benefits people expect to obtain from nature-based experiences.

Motivations are dynamic, and often change as recreationists progress in their recreational pursuits. Hobson Bryan (1977) proposed that outdoor recreationists move along a specialization spectrum from generalist to specialist (beginner to advanced) as they gain skills, knowledge, and experience in their recreational activity. As their specialization level changes, so do their motivations for participating (or the outcomes they seek from recreation), their setting and site preferences, and support for management actions (Martin, 1997). Researchers have found that specialization can predict conservation involvement and support for management among nature-based recreationists in many different contexts (Bryan, 1977; Hvenegaard, 2002; Dearden et al., 2006; Needham et al., 2007; Oh & Ditton, 2008; Lessard et al., 2018). Feedbacks can occur between recreationists and management objectives as the needs of generalists are prioritized (i.e., amenities, services, and infrastructure), leaving activity specialists to seek different spaces as the outcomes of their experiences change, potentially leading to user conflict and lower satisfaction with recreational experiences (Duffus & Dearden, 1990). Moreover, incorporating specialization in models of PEB accounts for the intensity of participation that may be related to the environmental attitudes and behaviors associated with different recreational activities (Teisl & O'Brien, 2003).

Nature-based recreationists have been historically segmented into “consumptive” (e.g., hunting, fishing, trapping) and “non-consumptive”/“appreciative” (e.g., hiking, wildlife watching) activities (Dunlap & Heffernan, 1975). However, segmenting recreationists according to consumptive vs. non-consumptive criteria does not account for the relative resource impacts of all recreational activities and also does not account for similarities and differences in motivations, values, and beliefs within and across groups of recreationists (Schreyer et al., 1989). For example, hunters and birdwatchers are often classified differently according to their resource impacts (consumptive vs. appreciative), but they share similar motivations for participation (such as being close to nature), concerns for habitat protection, and involvement in conservation activities (Kellert, 1978; McFarlane, 1994; Teisl & O’Brien, 2003; Cooper et al., 2015).

Novel typologies might be used to segment nature-based recreationists to help managers understand and facilitate the conditions through which people are motivated to engage in stewardship actions that benefit the natural environment (McFarlane, 1994; Hvenegaard, 2002; Glowinski & Moore, 2014). Wildlife-related values, recreational motivations, place attachment, and specialization are particularly important to wildlife managers who are charged with management of public trust resources, and who rely on the support of stakeholders to set policies and objectives for conservation and habitat restoration (Jacobson et al., 2010). The present study contributes to this effort by identifying the characteristics of nature-based recreationists that may help predict and support engagement in PEB. Greater engagement in PEB can help managers learn about and interact with their various constituencies and enable them to develop outreach and programmatic strategies that promote resource conservation and mitigate negative environmental impacts.

Methods

Sampling and data collection

Data for this chapter were collected through a web-based Qualtrics survey of self-identified nature-based recreation participants in Michigan using a tailored design method for internet surveys (Dillman et al., 2014). The online questionnaire was distributed through the GovDelivery e-mail database by the MDNR's Marketing and Outreach Division to 522,993 e-mail addresses. Reminder invitations were sent to e-mail addresses that had not completed the survey after one week, followed by a final reminder after four weeks. A total of 35,574 responses were received (7%); after removing out of state responses, incomplete surveys, and responses who had received the survey link externally, I received a final sample of 19,143 responses (4% response rate).

To assess potential non-response bias, I compared early and late respondents to the survey. The "continuum of resistance" model indicates that nonresponse is a function of effort required by the respondent to provide a response, and as such late respondents to the survey have more in common with those who did not respond than those who responded promptly (Lin & Schaeffer, 1995). Early respondents to the survey were more likely to be male and live in an urban area; they were also more likely to be avid, committed recreationists in terms days participated and self-reported skill level. However, there were no significant differences in age or type of primary recreational activity between early and late respondents. Late respondents were also significantly more likely to choose "no response" on demographic questions. The survey instrument and data collection protocols were approved by Michigan State University Human Research Protection Program (HRPP) Institutional Review Board (IRB STUDY00001445; available in Appendix A).

Table 4.1. Hypotheses tested in the structural model of nature-based recreation and PEB.

Hypothesis	Rationale	Supporting literature
H1a,b,c – Specialization	Specialization in nature-based recreation has a positive effect on PEB (H1a), a positive effect on motivations (H1b), and a positive effect on place attachment (H1c).	Oh & Ditton, 2008; Lessard et al., 2018; Dearden et al., 2006; Bryan, 1977; Cole & Scott, 1999; Salz et al., 2001
H2a,b – Place Attachment	Stronger place attachment to recreational settings has a positive effect on PEB (H2a) and a positive effect on motivations (H2b).	Larson et al., 2018; Walker & Chapman, 2003; Vaske & Kobrin, 2001; Gosling & Williams, 2010
H3 – Motivations	Recreational motivations (H3) as measured by REP scales have a direct influence on PEB.	Glowinski & Moore, 2014; deGroot & Steg, 2010; Hvenegaard, 2002; Kil, Holland, & Stein, 2014; van Riper et al., 2020
H4a,b – Value orientations	Mutualistic values (H5a) and Domination values (H5b) will differentially predict recreational motivations, which influence PEB.	van Riper et al., 2020; de Groot & Steg, 2008; de Groot & Steg, 2010; Inglehart, 1995; Lee & Jan, 2015; Manfredo et al., 2009

Variables measured

Nature-based recreation participation – Respondents were segmented according to self-reported participation in nature-based activities and ranking of most important recreational activities. Respondents first selected from among a range of 11 nature-based recreational activities to indicate which activities they had participated in within the past 12 months; Of the activities in which they participated, they were asked to rank them in order of their importance. The number one ranked item became their “primary recreational activity”.

Motivations – Motivations were measured by selecting items from the Recreation Experience Preference (REP) scales, which assess a diversity of goals and desired outcomes that recreationists associate with participation in nature-based recreation (Manfredo et al., 1996). Exploratory factor analysis suggested three underlying factors organize the 13 items presented from REP scales: *social*, *nature*, and *achievement*-oriented motivations. Respondents were asked

to rate the importance of each item on a 4-point scale from “Not Important” (1), to “Very Important” (4).

Specialization – Respondents were segmented by specialization according to their behavior, skill, centrality to lifestyle, and commitment to their primary recreational activity (Salz et al., 2001). Behavior was measured by asking respondents to report how frequently they had participated in their primary recreational activity in the past 12 months (number of participation days) and the number of years of experience they have in that activity. Skill was measured by asking respondents to rate their perceived skill relative to other participants on a 4-point scale from “Beginner” (1), “Intermediate” (2), “Advanced” (3), or “Expert” (4). Commitment and centrality to lifestyle were assessed by asking respondents to agree or disagree with lifestyle-oriented statements on a 5-point scale from “Strongly Disagree” (1), to “Strongly Agree” (5).

Place Attachment – Place-based constructs measure emotional or symbolic attachment to nature through nature-based recreation. Exploratory factor analysis suggested a unidimensional place attachment scale to measure the extent to which recreationists were attached to the primary place where they recreate. Items were presented as belief statements regarding respondents’ “primary recreational area” on a 5-point scale from “strongly disagree” (1) to “strongly agree” (5).

Wildlife Value Orientations – Value orientations are patterns of basic beliefs that reflect underlying values and orient higher order cognitions, such as attitudes and behavioral intentions (Schwartz et al., 2012). Wildlife value orientations (WVOs) focus specifically on beliefs regarding human-wildlife relationships and fall along a spectrum from utilitarian (use-oriented) beliefs to mutualistic (protection-oriented) beliefs (Fulton et al., 1996). I presented 13 items adapted from previous scales as belief statements on a 5-point scale from strongly disagree (1) to

strongly agree (5). Confirmatory factor analysis supported use of two dimensions of WVOs reflecting the latent constructs *Mutualism* and *Domination*.

Pro-Environmental Behaviors – I used a definition of pro-environmental behaviors (PEB) as defined by Cooper et al. (2015) as behaviors that “generate positive environmental impacts, promote environmental quality, and result in sustainable use of natural resources” (Cooper et al., 2015:446). Items were adapted from previous scales (e.g., Stern et al., 1999, Stern, 2000, Cooper et al., 2015) measuring PEBs to reflect behaviors that provide benefits specifically for wildlife conservation. Though often divided into three or four subdimensions of PEB, exploratory factor analysis suggested a unidimensional PEB scale fit my data best. I presented eight items on a 5-point scale to assess the frequency with which the respondent engaged in each particular behavior in the previous five years: never (1), rarely (2), occasionally (3), often (4), or very often (5).

Socio-demographic Characteristics – Demographic and socio-economic information was collected from respondents, including age, sex, income, education, type of residence (urban, suburban, or rural), county of residence, and ethnicity.

Data analysis procedures

I measured participation in 11 nature-based recreational activities: birdwatching, camping, canoe/kayaking, cycling/mountain biking, fishing, hiking, hunting, running/jogging, motorized activities, skiing, and wildlife viewing (see Table 4.2). Respondents were segmented into their primary recreation activity by asking them to first report all nature-based activities they had participated in, followed by ranking those activities in order of their importance. The #1 ranked activity was designated as their “primary recreation activity” and was used as a referent for questions in the survey.

Table 4.2: Total nature-based recreation participants by primary recreational activity.

Recreation Type	Total Participants	Total Primary	% Primary
Camping	14,522	4669	32%
Hiking	13,768	2668	19%
Canoeing/Kayaking	11,012	585	5%
Fishing	10,006	1572	16%
Wildlife Viewing	9859	535	5%
Cycling/Mtn Biking	8008	1110	14%
Birdwatching	7597	407	5%
Motorized	7262	1033	14%
Hunting	6555	2558	39%
Jogging/Running	4233	513	12%
Skiing	3797	199	5%

I conducted all statistical analyses using Stata 14 statistical software package (StataCorp, 2015). Research hypotheses were evaluated using a multi-step process of exploratory factor analysis (EFA), confirmatory factor analysis (CFA) to test a measurement model, and full structural equation modeling (SEM) to assess relationships between latent constructs (Kline, 2015). Since examination of the patterns of missing data indicated that data were likely missing at random with no variable containing more than 2% missing values, I used full information maximum likelihood (FIML) estimation for measurement and structural models (Enders and Bandalos, 2001; Cham et al., 2017).

The survey sample was split into two mutually exclusive datasets for exploratory and confirmatory procedures. An initial EFA (n=9571) with oblique rotation was conducted to identify underlying factor structure in the data and identify latent constructs (Costello & Osborne, 2005). A measurement model was then estimated using CFA (n=9572) to specify relationships between manifest and latent variables by examining factor loadings and assess reliability and validity of latent constructs (Bollen & Long, 1992). Items with factor loadings

<0.4 in the measurement model were dropped from the final analysis, resulting in a measurement model with eight latent factors and 41 indicators (Table 4.4).

Confirmatory factor analysis (CFA) assessed measurement reliability and construct validity of items in the survey and associated latent variables. Reliability refers to consistency in the measured items, while validity refers to the relationship between the manifest variables and latent constructs (Vaske, 2008). Cronbach's alpha and composite reliability metrics assessed internal consistency of items within latent constructs, while average variance extracted (AVE) provides a measure of convergent validity by determining the amount of variance in the latent construct accounted for by the observed variables (Valentini & Figueiredo Damasio, 2016). Finally, a full structural model was specified and estimated to test the hypothesized relationships between latent constructs. Path coefficients and parameter estimates were examined to determine directionality and strength of relationships in the structural model. Model fit was assessed using model chi-square, comparative fit indices (CFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR) (Jackson et al., 2009).

Results

Summary of respondents

Ages of respondents ranged from 19 to 96 ($M=54.6$, $SD=13.37$). More respondents were male (56%) compared to female (41%) and tended to be from a white ethnic background (92%). Ethnic minorities (1%), other (1%), and "no response given" (6%) combined to represent 8% of my sample. Most respondents were well-educated; 70% had a college degree. Residential setting varied with 27.3% residing in a rural area or small town (population less than 10,000), 30.2% in an urban area (population more than 50,000), and 21.3% in a small city (population between 10,000-50,000). Household income also covered a wide range with 15% earning less than

\$50,000USD annually, 34% between \$50-100k, 28% between \$100-200k, and 5% more than \$200k.

Table 4.3: Socio-demographic characteristics of survey respondents.

Variable	<i>n</i>	Percentage (%)
<i>Age (years)</i> 19-96 (M=54.6)	19,143	100
18-29	810	4.0
30-39	2255	12
40-49	3333	17
50-59	4773	25
60-69	5671	30
70+	2301	12
<i>Gender</i>		
Female	7848	41
Male	10,714	56
Other	124	0.7
<i>Ethnicity</i>		
American Indian/Alaska Native	96	0.51
Asian	48	0.26
Black	51	0.27
Native Hawaiian/Pacific Islander	3	0.02
White	17,228	92
Other	289	2.0
<i>Income</i>		
0-49,999	2799	15
50,000-99,999	6462	34
100,000-199,999	5310	28
200,000+	970	5.0
<i>Education</i>		
Less than HS diploma	47	0.3
HS diploma or equivalent	1489	7.8
Some college, no degree	3813	20
Associate's degree	2478	13
Bachelor's degree	6255	33
Master's degree	3621	19
Professional degree	493	2.6
Doctorate	448	2.3
<i>Residence</i>		
Urban (population 50,000+)	5749	30
Town (population 2000-50,000)	8490	44
Rural (population less than 2000)	4572	24

Respondents were experienced and avid participants in outdoor recreation, with nearly 70% reporting more than 20 years of experience in their primary recreation activity and 44% reporting more than 30 days of participation in the past year. Many belonged to national or

international environmental conservation organizations (18%), hunting organizations (16%), local or regional conservation groups (11%), and various fishing (8%) birding (7%), cycling (6%) and hiking (6%) related organizations.

Measurement model

The measurement model highlighted differences in motivations, value orientations, specialization, recreational place attachment, and engagement in PEB among survey respondents (Table 4.4). On average, respondents were more motivated to participate in nature-based activities by factors related to the latent variable *Nature* (M=2.99, SD=0.04) than by *Achievement* (M=2.90, SD=0.09) or *Social* (M=2.25, SD=0.10) motivations. The most important motivation (on a scale of 1-4) was “*Get outdoors and enjoy nature*” (M=3.04, SD=0.92). A *Mutualistic* value orientation toward wildlife (M=3.63, SD=0.71) was slightly more prevalent among survey respondents than a *Domination* value orientation (M=3.27, SD=0.90). Respondents were generally in agreement with *Specialization* (M=3.79, SD=0.55) and *Place attachment* (M=3.67, SD=0.47) items. The most frequently performed PEB was *voted to support a policy or regulation that supports wildlife conservation* (M=3.52, SD=1.23), and the least frequently performed PEB was *participated as an active member in a wildlife conservation group or organization* (M=1.72, SD=1.00).

Cronbach’s alpha (α) and composite reliability (CR) generally provide evidence of high internal consistency of items within latent constructs when alpha values exceed .7 and CR values .6 (Brown, 2015). Although alpha coefficients were generally high (> 0.8), a modest alpha value (0.47) was observed for the latent construct “*Nature*” motivations. However, the same subscale achieved a CR score of 0.68, indicating acceptable reliability, and the umbrella latent factor of “*Motivation*” retained a high measure of internal consistency ($\alpha = 0.81$; CR = 0.90). Average

variance extracted (AVE) is a measure of convergent validity that expresses of the amount of variance explained by the items in the latent constructs (Hooper et al., 2008). AVE values in the measurement model generally fall below the desirable cutoff of 0.5, suggesting measurement error may account for a significant amount of variance in item responses. However, convergent validity of scale items can still be demonstrated when AVE is less than 0.5 if CR is above 0.6 (Fornell & Larcker, 1981). In all cases where AVE was less than 0.5 in my measurement model, CR was higher than 0.6 providing adequate evidence of convergent validity.

Table 4.4: Item means, factor loadings, and reliability and validity metrics for latent factors in measurement model.

Factor/Indicator	<i>M(SD)</i>	λ	α	CR	AVE
Motivation^b	2.71(0.34)		0.81	0.90	0.51
Social	2.25(0.10)		0.77	0.79	0.56
Share my skill and knowledge with others.	2.11(0.95)	0.84			
Meet other people who share my interests.	2.28(0.96)	0.52			
Help others develop their outdoor skills and knowledge.	2.36(0.95)	0.84			
Nature/Intrinsic	2.99(0.04)		0.47	0.68	0.43
Experience solitude.	2.94(0.87)	0.65			
Get outdoors and enjoy nature.	3.04(0.92)	0.48			
Interact with wildlife.	2.98(0.87)	0.79			
Achievement/Knowledge	2.90(0.09)		0.71	0.77	0.53
Learn about wildlife and nature.	2.94(0.87)	0.74			
Improve my skills and knowledge.	2.98(0.87)	0.74			
Challenge my skills and abilities.	2.77(0.97)	0.71			
Wildlife Values^c	3.43(0.84)		0.83	0.78	0.23
Mutualist Orientation	3.63(0.71)		0.80	0.86	0.42
Nature has as much right to exist as people.	4.46(0.92)	0.58			
Wildlife have inherent value above and beyond utility to people.	4.47(0.85)	0.48			
Animals should have rights similar to the rights of humans.	2.81(1.36)	0.83			
I personally feel a strong emotional bond with wild animals.	3.43(1.16)	0.62			
I care are about wild animals as much as other people.	2.97(1.27)	0.71			
Domination Orientation	3.27(0.90)		0.73	0.87	0.27
Wildlife only valuable if people get to utilize them in some way.	1.80(1.05)	0.43			
Humans should manage fish and wildlife populations so that humans benefit.	2.99(1.22)	0.59			
Needs of humans should take priority over the needs of fish and wildlife.	2.76(1.22)	0.62			
People who want to legally hunt should be provided the opportunity to do so.	4.30(0.93)	0.49			
Acceptable to kill wildlife if they think it poses and threat to their property.	3.36(1.21)	0.62			

Table 4.4 (cont'd)

Acceptable to kill wildlife if they think it poses a threat to their life.	4.41(0.90)	0.44			
<i>Specialization^c</i>	3.79(0.55)		0.80	0.79	0.36
Primary recreational activity has a central role in life.	4.05(0.96)	0.64			
Feel like a part of primary rec activity community.	3.59(1.12)	0.77			
Social circle revolves around primary rec activity.	3.04(1.20)	0.68			
Own a lot of equipment related to primary rec activity.	4.12(1.13)	0.63			
Family supports participation in primary rec activity.	4.55(0.75)	0.43			
Encourages others to participate in primary rec activity.	4.19(0.92)	0.55			
Skill level compared to others.	3.00(0.59)	0.40			
<i>Attachment to Recreational Setting^c</i>	3.67(0.47)		0.89	0.88	0.53
Get more satisfaction out of visiting this area than any other.	3.48(1.06)	0.50			
Would not substitute any other area for doing what I do here.	2.59(1.18)	0.47			
Think often about going to this area.	3.85(0.99)	0.62			
Strongly attached to this area.	3.89(1.06)	0.91			
Identify strongly with this area.	3.82(1.06)	0.90			
Area means a great deal to me.	4.04(1.00)	0.87			
Can be myself when I visit this area.	4.02(0.96)	0.70			
<i>Pro-Environmental Behavior (PEB)^d</i>	2.29(0.66)		0.85	0.86	0.47
Volunteered for wildlife habitat improvement projects on public land.	1.81(0.98)	0.66			
Voted to support a policy or regulation that supports wildlife conservation.	3.52(1.23)	0.41			
Participated as an active member in a wildlife conservation group.	1.72(1.05)	0.86			
Contributed money to a wildlife conservation organization.	2.57(1.23)	0.63			
Attended meetings about wildlife conservation issues.	1.73(1.00)	0.78			
Contacted elected officials or government agencies about wildlife conservation issues.	1.78(1.11)	0.72			
Talked to others about wildlife conservation issues.	2.89(1.19)	0.66			

^aStatistical symbols: λ = factor loading; α = Cronbach's alpha; AVE = Average variance extracted; CR = Composite reliability.

^bItems rated on a scale from 1 = Not important to 4 = Very important.

^cItems rated on a scale from 1 = Strongly disagree to 5 = Strongly agree.

^dItems rated on a scale from 1 = Never to 5 = Very often.

AVE = $(\sum \lambda^2) / [\sum \lambda^2 + \sum (\theta)]$; CR = $(\sum \lambda)^2 / [(\sum \lambda)^2 + \sum (\theta)]$.

Structural model

A structural equation model was estimated and evaluated using a range of goodness of fit indices, which indicated acceptable fit. The structural path model shows the relationships between latent constructs leading to pro-environmental behaviors (Figure 4.1). I found that the constructs *Specialization* and *Place* both had direct positive effects on PEB (supporting hypotheses H1a and H2a), and direct effects on recreational motivations (consistent with

hypotheses H1b and H2b). *Specialization* had a stronger direct influence on PEB ($\gamma = .14$) than *Place* ($\beta = .05$), and stronger effects on all three dimensions of motivation. *Specialization* also had a significant positive influence on *Place* ($\gamma = .29$), indicating that activity specialists are likely to be more attached to recreational settings than activity generalists, and confirming hypothesis H1c. Two dimensions of motivations, *Nature* and *Social*, positively predicted engagement in PEB ($\beta = .21$ and $.12$), supporting hypothesis H3. *Mutualistic* and *Domination* value orientations predicted three dimensions of recreational motivations, which in turn predict engagement in PEB. *Mutualistic* values were more important in predicting *Nature* ($\gamma = 0.45$) and *Achievement* ($\gamma = 0.31$) motivations, while *Domination* values were more important for *Social* ($\gamma = 0.34$) motivations, consistent with study hypotheses H4a and H4b. Four constructs were significantly and positively associated with engagement in PEB: *Place* ($\beta = .05$), *Specialization* ($\gamma = .14$), *Nature motivations* ($\beta = .21$), and *Social motivations* ($\beta = .12$). Effects were modest, with *Nature motivations* (i.e. *interact with wildlife; get outdoors and enjoy nature*) exerting the strongest influence on PEB. The only insignificant path in the model was between *Achievement motivations* and PEB. All four study hypotheses were supported by the structural model: H1 – Specialization will predict place attachment, motivations, and PEB; H2 – Place attachment will predict motivations and PEB; H3 – Motivations will predict PEB; and H4 – Wildlife-related value orientations will predict motivations (see table 4.1).

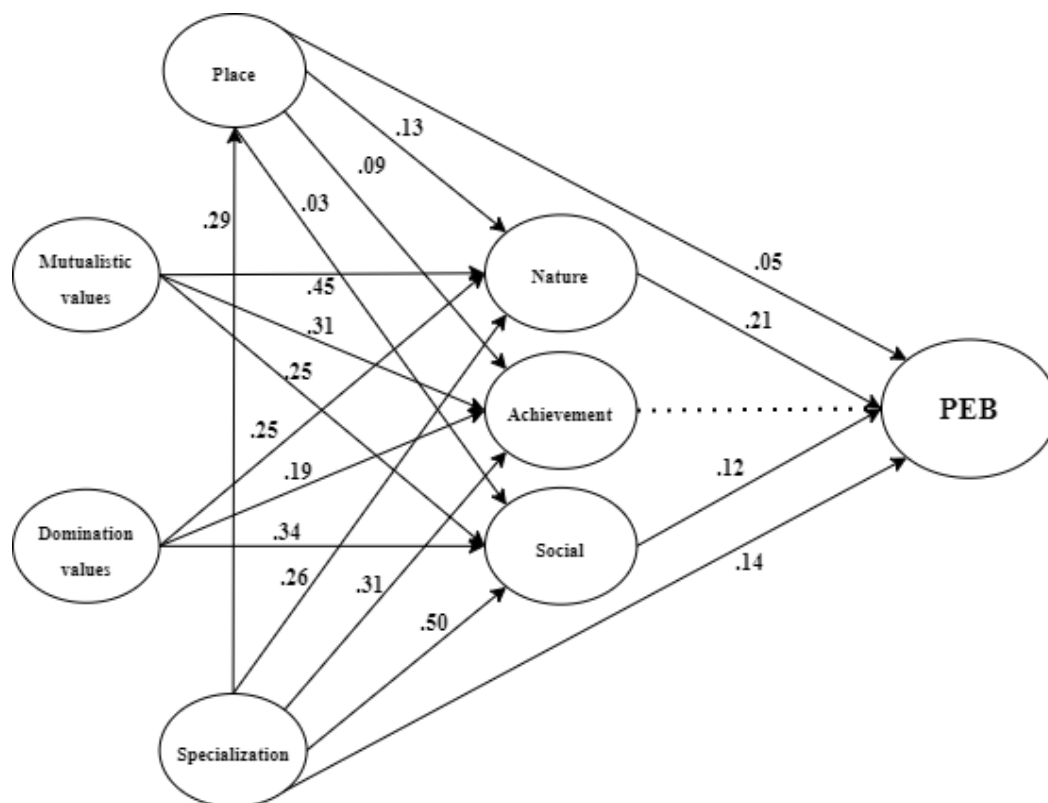


Figure 4.1: Standardized regression coefficients for structural path model.

Note: Solid lines denote significant relationships at the $\geq 95\%$ level; dotted lines denote statistically insignificant relationships.

Fit indices: $\chi^2=0.000$; CFI=0.91; TLI=0.90; SRMR=0.06; RMSEA=0.05

Discussion

I investigated the relationships between values, motivations, and pro-environmental behavior (PEB) for nature-based recreationists in Michigan focusing specifically on the role of wildlife-related value orientations, place attachment, specialization, and the mediating role of recreational motivations. Results from my study inform models predicting pro-environmental behaviors that might lead to more successful conservation outcomes, as well as help wildlife and recreation planners to 1) understand motivations for participation in nature-based recreation and provide services and experiences that lead to satisfactory outcomes; 2) anticipate how recreational motivations will change in response to different levels of specialization and place attachment; 3) predict how recreational motivations may vary based on stakeholder values; and

4) use knowledge of factors that influence engagement in PEB to design programs and outreach strategies that facilitate stewardship opportunities for nature-based recreationists.

Recreational motivations have been studied extensively as part of a management-focused approach to the beneficial outcomes recreationists desire and satisfaction with recreational experiences (Hendee, 1974; Driver, 2008). Consistent with my study hypotheses, we found that three dimensions of recreational motivations – nature, achievement, and social motivations – differentially predicted engagement in PEB. These findings are similar to those of McFarlane (1994) and Glowinski and Moore (2014) who looked at recreational motivations and PEB in the context of birdwatching and found that achievement-oriented factors, social opportunities, and conservation or nature-oriented factors led to differing levels of environmental concern. Anderson et al. (2008) also found a multidimensional classification of experiences in nature, social interaction, and intrinsic benefits for physical and mental health to be among the primary motivations for visiting natural areas. Only two dimensions of recreational motivations in my model positively predicted engagement in PEB: *Nature* ($\beta=.21$) and *Social* ($\beta=.12$). Nature-oriented motivations, such as *learning about or interacting with wildlife*, and *getting outdoors to enjoy nature* had a stronger influence on PEB than social factors like *meeting similar people* or *sharing skills and knowledge*. Managerial objectives focused on increasing engagement in stewardship could benefit from strategies that emphasize opportunities for education, interaction, and place-based learning in nature as ways to facilitate conservation involvement.

Values underpin higher order cognitions through influences on patterns of basic beliefs, attitudes, and behavioral intentions (Ajzen, 1991; Schwartz et al., 2012). Wildlife-related value orientations were hypothesized to be associated with recreational motivations, and my model confirmed that both mutualism and domination orientations were associated with the three

dimensions of recreational motivation. A mutualist orientation, or beliefs that emphasize relationships of trust and protection between humans and wildlife, had a strong influence on the importance of nature-oriented motivations. Conversely, stronger domination orientations, or beliefs that emphasize utilitarian uses of wildlife that benefit humans, led to greater increases in the importance of social motivations which were less influential than nature-oriented motivations on PEB.

My model highlights the importance of wildlife value orientations in shaping recreational motivations. Moreover, these findings affirm prior studies linking nature-based recreation with underlying values (van Riper et al., 2020), environmental attitudes (Tarrant & Green, 1999; Thapa, 2010), pro-environmental behaviors (Cooper et al., 2015; Larson et al., 2018), and nature-oriented motivations (Luo & Deng, 2008). Evidence indicates that value orientations generally are shifting away from utilitarian perspectives and toward protectionist or biocentric perspectives toward natural resources (Inglehart, 1995; Inglehart & Baker, 2000; Manfredi et al., 2003, 2009), indicating that mutualist value orientations will likely become more prevalent among wildlife stakeholders in the future with a corresponding shift in preferences for recreational activities that are consistent with appreciative (as opposed to consumptive) recreation (Cordell, 2008).

Messages from managers and administrators that account for the underlying values and beliefs of stakeholders regarding the nature of relationships between humans and wildlife are more likely to resonate effectively when targeted toward appropriate audiences. For example, messages can be tailored to the objectives of specific management planning goals and the perspectives of stakeholders based on the degree to which they align with utilitarian, mutualist, pluralist, or distanced perspectives (Bright et al., 2000). Respondents generally agreed on

average with mutualism ($M=3.64$) and domination ($M=3.27$) statements, indicating that there may be a high number of “pluralist” respondents in my sample, or respondents who hold both protection and use-oriented perspectives (Teel & Manfredi, 2010). Those with pluralist orientations identify more strongly with utilitarian perspectives in some circumstances and protectionist perspectives in others, indicating they are a relevant and engaged group of stakeholders who care about the treatment of wildlife and decisions that affect wildlife. Their support or opposition to certain policies and decisions might be context-dependent, highlighting the need for effective communication and outreach strategies.

The contextual factors of specialization and recreational place attachment added an additional layer of nuance to understanding factors that influence engagement in PEB for nature-based recreationists. Specialization had a strong effect on all three motivational dimensions, however, the relationship was strongest for social motivations. In other words, as a recreationist progresses along the specialization continuum, gaining experience and skill in that activity, the desire to share skills and help others develop their outdoor skills and knowledge might increase in importance. This is consistent with prior research measuring skill as part of a specialization index in which the most advanced, or “expert” recreationists are defined as facilitators of the recreational activity, and who often “encourage, teach, or enhance opportunities for others interested in the activity” (Donnelly et al., 1986; Miller and Graefe, 2000; Needham & Vaske, 2013).

My model, however, also indicated that social motivations had a modest positive influence on engagement in PEB ($\beta=.12$), so whether specialization is a useful construct for predicting PEB may depend on the specific context of the recreational activity and other factors (Oh & Ditton 2008). The decision to act in pro-environmental ways is at least partially a product

of desired benefits manifesting from place-based experiences in nature (Kil et al., 2014), and my results (and others, e.g., Virden, 1986; McFarlane, 1994; Hvenegaard, 2002; Schroeder et al., 2006, etc.) are consistent with the idea that specialization is an important construct influencing recreational motivations and PEB.

Somewhat surprisingly, in my sample of nature-based recreationists, a single dimension of place attachment, though statistically significant, had a weak positive effect on PEB ($\beta=.05$). The relationship with recreational motivations was similarly weak, though the effect of nature-oriented motivations was modestly more influential ($\beta=.13$) than for achievement ($\beta=.09$) or social ($\beta=.03$) motivations. The influence of place attachment on nature motivations is consistent with previous literature on the role of place and its importance in strengthening pro-environmental attitudes and behaviors (Hinds & Sparks, 2008). For example, Kyle, Mowen, and Tarrant (2004) reported similar associations in strength and valence between place attachment and nature-oriented recreational motivations. Other studies further suggest an important role for place-based constructs in strengthening conservation-recreation behavioral models (e.g., Siemer et al., 2017; Larson et al., 2018).

Accounting for emotional and symbolic aspects of nature-based experiences and explicitly modeling attachments to nature may help managers predict place-based motivations based on area use histories (Ditton et al., 1992; Stedman, 2002). However, place attachment alone is not likely sufficient to mobilize pro-environmental actions. Interactions with other contextual factors, such as motivations and specialization, may help managers anticipate how reactions to environmental degradation or compliance with regulatory approaches might change as a function of specialization and place attachment (Bryan, 1977; Bricker & Kerstetter, 2000; Oh & Ditton, 2008). For example, activity specialists who have a high emotional affinity for a

particular park or river, and who are motivated by nature-oriented aspects of recreation may be more likely to voice concerns over proposed land use changes or advocate for increased user restrictions on degraded landscapes.

Several factors limit the generality of this chapter's findings. This sample of nature-based recreationists are not likely representative of broader populations, and thus generalizability is limited to the sample population. The potential for non-response bias was assessed by comparing early and late responders based on the "continuum of resistance" model (Lin & Schaeffer, 1995), which indicated that non-respondents may have been less specialized, more likely to be female, and live in a rural area. The survey sample was also not representative of the ethnic diversity found in the general population, and as such important issues related to equity and inclusion in outdoor spaces were not able to be addressed by this study. Intentionally sampling minorities to gain perspectives of recreationists of color would provide stronger insights on which to improve management of resources and recreational experiences directed toward achievement of diversity, equity, and inclusion. Additionally, future research that further segments respondents would likely help determine how participation is related to PEB across multiple types of recreation.

Conclusions

This study contributes to the understanding of relationships between nature-based outdoor recreation, values, motivations, and pro-environmental behaviors. I found that specialization, place attachment, motivations, and value orientations were positively associated with engagement in PEBs for a sample of nature-based recreationists in Michigan, USA. My model results suggest those who have mutualistic values and who are motivated by nature-oriented outcomes of recreational experiences may be the most likely to provide support and stewardship behaviors that are aligned with management and conservation goals. These findings

offer actionable insights to improve our understanding of social behavior of nature-based recreationists in Michigan. Although values and value orientations held by individuals tend to be stable over time, predominant value orientations on macro scales reflect broad demographic shifts in society and changing perspectives on natural resources (Inglehart & Baker, 2000). Models of management and conservation that anticipate how value orientations affect the diversity of opinions, preferences, and expectations among the beneficiaries of public natural resources may be more likely to successfully balance needs of stakeholders with ecosystem conservation. Further, understanding the role of recreational motivations and the benefits that recreationists seek by engaging in nature-based experiences can strengthen the ability to segment stakeholders according to their goals, and anticipate their responses to different management and planning strategies. Such knowledge can be expected to enable better outcomes related to conservation of biodiversity, ecosystem management, land use changes, and user-based conflicts.

CHAPTER 5: SUMMARY AND CONCLUSIONS

“Like the resource it seeks to protect, wildlife conservation must be dynamic, changing as conditions change, always seeking to become more effective.”

- Rachel Carson, 1948

“Conservation, viewed in its entirety, is the slow and laborious unfolding of a new relationship between people and land.”

- Aldo Leopold, 1940

Summary of findings

The overarching goals of this dissertation were to generate scientific knowledge on the social-psychological foundations of human-nature interactions and contribute to the field of human dimensions of wildlife and conservation. The specific objectives of this project were to (1) explore motivations and barriers for participation in nature-based recreation from the perspective of non-traditional stakeholders, (2) investigate support for alternative conservation funding policies among nature-based recreationists, (3) assess the social psychology of engagement in stewardship behaviors that benefit wildlife and associated habitats, and (4) identify opportunities for interventions that increase retention of general outdoors enthusiasts and implications for management practitioners.

Overarching objectives, research questions, and hypotheses were based on the belief that public support is an important component of successful wildlife management and conservation (Decker et al., *in press*) and more inclusive and responsive forms of governance will lead to greater conservation success for wildlife and ecosystems (Decker et al., 2016). Wildlife management and conservation is a social, as well as scientific, endeavor and the inclusion of social data is an integral step to achieving conservation goals and providing equitable access to recreational resources and experiences. Integrating normative perspectives of stakeholders into

biologically oriented management decisions brings the wildlife conservation institution closer to the stated ideals of public trust thinking and democratic governance of public resources through scientific management of wildlife and habitat that is consistent with public values (Jacobson et al., 2010).

Specifically, I investigated how social identity, motivations, values, demographics, and other constructs (i.e., independent variables) influenced stakeholder support for conservation funding mechanisms and engagement in stewardship or pro-environmental behaviors (i.e., dependent variables). I used a mixed-methods approach divided into two distinct qualitative and quantitative data collection phases (Creswell & Clark, 2017). Complementary methodologies enable researchers to triangulate different sources of data to examine phenomena from multiple perspectives (Jick, 1979; Mathison, 1988). Mixed methods also draws on the strengths of divergent epistemological paradigms underlying qualitative and quantitative research traditions to reveal practical insights to research problems (Clark, 1998).

I designed and implemented interviews and a web-based survey of nature-based recreation stakeholders, conceptually based in established behavioral theories (e.g., social identity theory, theory of planned behavior; Figure 1.1), to test hypotheses and achieve research objectives. Research phase 1 utilized in-depth interviews and qualitative analysis to explore the motivations and meanings of experiences in nature through birdwatching and mountain biking (Chapter 2). Respondents indicated that multiple cognitive, emotional, social, and place-based motivational frames shaped their expectations for recreating in nature. Primary intrinsic motivations included relaxation, escape/solitude, enjoying nature, discovery/novelty, fitness/health, and overcoming challenges; place-based motivations included setting/aesthetics, access, local knowledge, and trail characteristics/sustainable development; formation of an

identity involved with nature-based activities resulted from childhood experiences in nature, mentorship, social connection, group membership, and stewardship/conservation involvement. Respondents' desired outcomes shifted over time as they gained experience and knowledge from activity-specific goals (e.g., identify more birds, ride further distances, etc.) to satisfy more fundamental needs such as self-efficacy, social connection, family functioning, and restoration.

Concepts of environmental stewardship and conservation depended on patterns of socialization, group norms, and individual ethics; for mountain bikers, stewardship and conservation revolved around sustainable trail development, trail maintenance, and mitigating negative environmental and social impacts associated with mountain biking. Most respondents were active and committed members of Mountain Bike Association chapters where group norms, social functions, events, and organized rides contributed to feelings of affiliation and a desire to “fit in” with the mountain biking community. This provided the opportunity for education on sustainable trail development and the development of social norms that encourage participation in trail maintenance (i.e. “trail days”).

For birdwatchers, the concepts of conservation and stewardship were shaped by childhood influences (often family members) and moral obligations to wildlife and the environment, leading to engagement in stewardship through monetary donations to conservation organizations, volunteerism, and wildlife habitat improvement. Birding is an activity that requires close observation of connections between animals and their habitat, leading to ecological and natural history knowledge (Watson, 2016). Birders who had a well-developed sense of environmental concern and strong attachments to place were more likely to participate in citizen science initiatives, organized birding trips, and cite the importance of environmental education and youth programs. There were notable exceptions, however, where individuals in

both groups held a high level of knowledge and experience yet preferred solitary experiences and were not active in the respective recreational communities. Higher order meanings of (re)connection to oneself, other people, and nature emerged for both groups through experiential feedbacks and repeated participation over time.

In research phase 2, I used a web-based survey to collect data on nature-based recreation participation in Michigan and statistical analysis to model stakeholder support for wildlife conservation funding policies and engagement in stewardship behaviors that benefit wildlife and conservation efforts (Chapters 3 and 4). More than 540,000 e-mails containing a link to the survey were sent by the Michigan Department of Natural Resources Marketing and Outreach Division in June 2020. I received 19,143 useable responses, resulting in a final response rate of 4%. Although survey respondents were not ethnically diverse, responses represented a broad range of socio-demographic backgrounds, including recreational participation types, males and females, levels of education, income, and rural/urban residence. Descriptively, the most popular nature-based recreation for the survey sample was camping, followed by hiking, canoeing/kayaking, fishing, and wildlife watching (Figure 5.1). Respondents were asked to rank the activities in which they engaged in order of importance, with the most important designated their “primary recreational activity.” The recreational activity considered most important by the highest proportion of respondents was hunting (40%), followed by camping (32%), and hiking (19%).

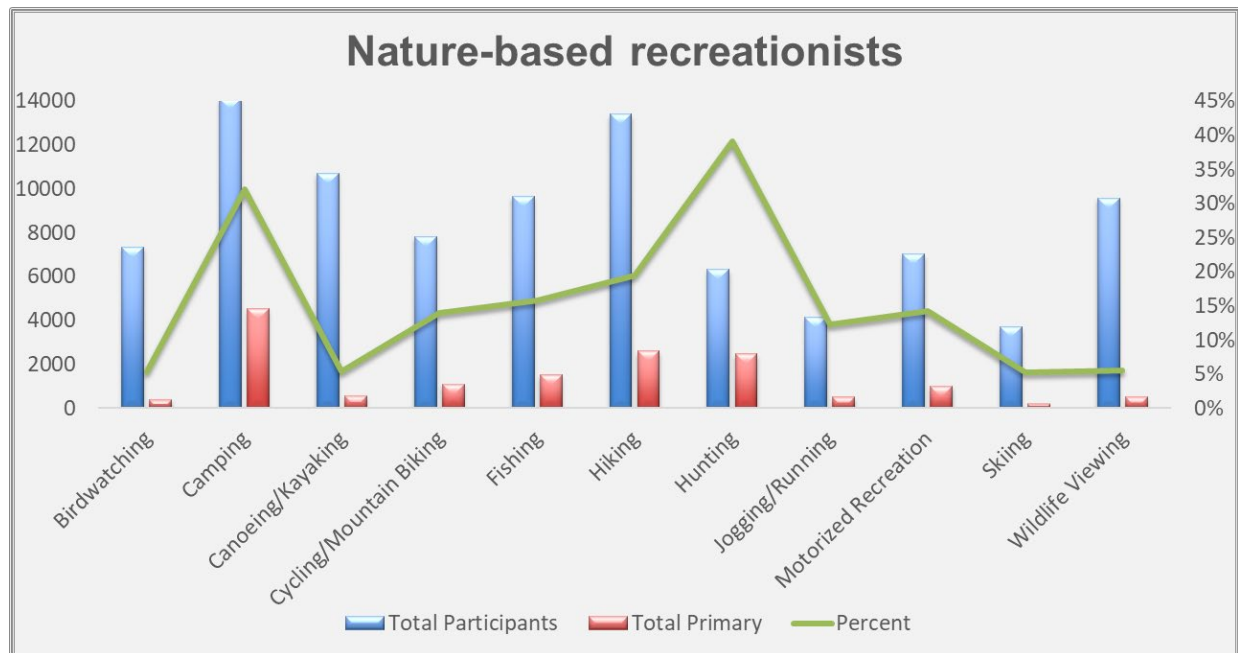


Figure 5.1: Nature-based recreation in Michigan; total participants and percent of participants designating category as primary.

I also collected data from recreational users regarding their motivations for participating in nature-based recreation, their wildlife value orientations, specialization level, and attachment to recreational settings. These constructs were used as independent variables in two models predicting support for alternative wildlife conservation funding policies and engagement in stewardship behaviors (dependent variables). A subsample of the survey population consisting of hunters and wildlife watchers was selected to contrast and segment stakeholders according to their support for alternative conservation funding policies (Chapter 3). Hunters are an important group due to the historical dependence of wildlife management on hunting for financial support through excise taxes and license sales (Duda et al., 2021), while wildlife watchers represent a newer, more diverse subset of wildlife-associated interests that is increasing in popularity (Cordell, 2012; USFWS, 2018). Additionally, all respondents were included in a structural equation model predicting engagement in self-reported measures of stewardship behaviors

(adapted from previous instruments measuring pro-environmental behaviors) that directly benefit wildlife and conservation efforts (Chapter 4).

Overall, the stakeholders surveyed supported the proposed options to increase funding for conservation from general sources of taxation or an extractive-industry contribution but opposed a user-based tax on general outdoor gear (i.e., backpack tax). Results of binary logistic regression modeling suggested different variables influence strength of support for alternative conservation funding policies, and that support depends on whether the proposed policy is a general or user-based tax. Mutualist value orientations, past stewardship engagement, and knowledge of conservation funding mechanisms generally increased support for novel funding policies, while domination value orientations, social capital, and age generally decreased support.

A structural equation model quantified relationships between nature-based recreationists and stewardship behaviors, such as voting to support policies or regulations that affect wildlife, wildlife habitat improvement on private land, volunteerism, donating money to conservation organizations, or participating in wildlife conservation meetings. Results indicated that wildlife value orientations, recreational place attachment, specialization, and motivations all influenced engagement in stewardship activities that benefit wildlife. The strongest predictors of stewardship were mutualistic values toward wildlife and “nature” or “social” dimensions of recreational motivations as measured by recreation experience preference (REP) scales. Attachment to recreational setting was a weaker prediction of stewardship engagement than other variables. Generalized measures of place attachment, however, may not capture affective responses that attachment to localized, specific places or landscapes might trigger. Additionally, specialization influenced motivations and place attachment for nature-based recreationists but was not strongly predictive of engagement in stewardship.

Overall, my findings point toward the importance of understanding the determinants of support for conservation, whether through supporting policies, engaging in stewardship actions, or identification with stakeholder groups. Various cognitive, affective, and socio-demographic variables were found to be associated with support for conservation among nature-based recreation stakeholders, with implications for wildlife conservation and management.

Recommendations for wildlife and conservation professionals

The research comprising this dissertation is relevant to state wildlife management agencies (SWAs), federal natural resource agencies, NGOs, and other associated partners with an interest in the social dimensions of wildlife management and conservation. My results highlight potential pathways for encouraging stewardship behaviors and building on public support for novel approaches to funding conservation efforts in the face of declining traditional sources of revenue. Practical contributions from my research may also help agencies align biological and social objectives (such as increased trust and acceptance of management actions), leading to more effective communication and socially acceptable decisions. Three main recommendations are offered for wildlife professionals based on my data and practical insights gained throughout my dissertation research:

(1) **Expand and diversify sources of funding for wildlife conservation.** My research occurs within the context of contemporary challenges for wildlife management and conservation efforts that include declining numbers of traditional stakeholders (e.g., hunters, anglers, trappers), a changing socio-demographic landscape (e.g., increased levels of urbanization and suburbanization), and questions of relevancy of conservation to broader publics. The issue of conservation funding has received urgent consideration from SWAs as hunting license revenue and allocations from Pittman-Robertson excise taxes wane in response to declining hunting

participation (Williams, 2010; Echols et al., 2019). Chapter 3 of my dissertation research calls attention to the potential for nature-based recreationists to support various mechanisms for expanding sources of financial assistance for conservation and management through general taxation, lottery proceeds, user-based taxes and fees, or taxes on extractive industry revenue.

Support exists among a majority of recreationists surveyed for all policy options except user-based taxes and fees on outdoor equipment (i.e. “backpack tax”); past engagement in stewardship and knowledge of conservation funding mechanisms, however, were associated with increased support for a backpack tax policy, suggesting that efforts aimed at increasing knowledge and education about the ways in which conservation and wildlife habitat initiatives are funded would improve the outlook for a greater suite of options for conservation funding. Further investment in education and awareness of the need for a more diverse portfolio of funding sources to ensure sustainable conservation efforts, paired with knowledge of the history of such efforts that has relied on a “user-pay, public-benefit” model funded by hunters and anglers, would likely gain supporters for a “backpack tax” or other user-based funding policies.

Policies are unlikely to be perceived uniformly by constituents and targeted communications that integrate an understanding of psychological characteristics of various audiences to frame policies are more likely to be persuasive. In lieu of advocating for user-based solutions, policy makers may find greater support when emphasizing extractive industry contributions or “sin” taxes (e.g., lottery proceeds) as a means to diversify conservation funding sources. Although my survey respondents supported a state sales tax option, support among the general public may be lower and political obstacles may be higher than the other options that were also well supported. Additionally, policy and decision makers should consider how

individual characteristics such as values and motivations might affect support or opposition to specific policy or regulatory proposals.

The ability to propose and pass new wildlife policies or regulations generally falls under the authority of Congress, state legislatures, boards and commissions, or other trustees of wildlife resources who are accountable to their state's constituents through elections and ballot initiatives (Smith, 2011). Trust managers, on the other hand, are limited in their ability to advocate or lobby for particular legislative solutions to conservation problems; they do, however, play an important role in interfacing with the public and carrying out the work of management and conservation. In this context, an emphasis on messaging and educational program delivery can bring attention to current funding mechanisms as well as future needs, and highlight the benefits that wildlife conservation confers to different types of recreational stakeholders to increase public support for policy change (Nkansah et al., 2021).

(2) Leverage normative influences through partnerships to lower the barriers to institutional adaptation and collaborative governance. Support for conservation may be approached through options other than diversifying sources of funding for SWAs. Cooperative agreements, public-private partnerships, grant programs, and private land conservation initiatives can efficiently and effectively distribute resources to fill unmet conservation needs where unilateral governmental efforts fall short (Rudolph et al., 2012). As one of the highest “rungs” on the ladder of citizen participation in democratic governance (Arnstein, 1969), partnerships are an effective organizational tool for incorporating the perspectives and expectations of stakeholders into wildlife management decisions (Rudolph et al., 2012). Partnering with various organizations can help SWAs gain greater trust and acceptance for management decisions, recruit participation in stewardship programs, share expertise and knowledge, deliver programs that engage

stakeholders, and leverage social norms present in recreational communities to increase support for conservation among new audiences.

Normative factors operate in organizations and social networks by shaping perceptions of behaviors that are acceptable and/or common, thus motivating behavior to conform (or not conform) with group standards (Cialdini, 2003). Using mountain bikers in Michigan as a case study in phase 1 of my dissertation research, I observed evidence of the potential for social norms in the mountain biking community to shape conservation ethics and behaviors of its members. Mountain bikers who engaged in organizations often participated in trail maintenance and were concerned with sustainable development of trails to reduce erosion, rutting, and sedimentation, and they were accepting of trail closures to reduce negative environmental impacts. These actions also benefit local wildlife habitat, yet evidence that riders and leaders in the community connect their stewardship actions to broader conservation benefits for wildlife was limited. The social norms that encourage active engagement with trail development and maintenance could be extended to include a broader conservation ethic that organizations facilitate to help establish and develop their membership through targeted outreach, education, and coordination with conservation interests.

Conservation advocates, agencies, and associated partners may be able to take advantage of existing organizational networks and social norms present in other environmental communities as well. Wildlife professionals may be particularly attuned to relationships with wildlife conservation-oriented organizations (e.g., Ducks Unlimited, Pheasants Forever, etc.) where the connections to wildlife management for their beneficiaries are self-evident. Broader animal rights and environmental organizations, however, may also be a source of significant support for conservation goals (Knezevic, 2009).

Interviews with members of the mountain biking and birdwatching communities revealed a range of goals and motivations for seeking nature-based experiences and extensive sets of environmental values, yet distanced perspectives on top down, expert-driven models of wildlife conservation. This is in stark contrast to the messaging that often permeates the wildlife profession (Feldpausch-Parker et al., 2017). In other words, the verbiage of historical models of conservation, led by experts through authoritative, top-down governance, simply does not resonate with many contemporary stakeholders (Holling and Meffe, 1996). Partnerships, however, provide a mechanism for achieving conservation goals, and enacting meaningful change in conservation may be best achieved with alignment of various conservation interests and the collective efforts of partnerships and campaigns that promote diverse outdoor recreational opportunities and other broader public benefits while working in tandem to advance conservation objectives.

(3) Integrate human dimensions insights into wildlife management objectives, recommendations, decisions, and policies. My research findings indicate that value orientations and motivations are important determinants of stewardship behaviors and willingness to support policies. Further, efforts to increase transparency in decision making and improve trust in management decisions leads to greater cooperation and compliance with regulations among some stakeholders such as hunters (Rudolph & Riley, 2014). Human dimensions information will continue to be an integral component of successful planning and implementation of management and conservation strategies. Conservation messaging often does not account for audience heterogeneity or segmentation to effectively tailor communication strategies (Kidd et al., 2019). For example, knowledge of stakeholder values and motivations can help predict or anticipate how messages from trust managers and trustees will resonate with

different segments of the public. The ability to increase support for conservation, effectively engage stakeholders, facilitate opportunities for stewardship actions, or anticipate which groups are more likely to participate in stewardship depends on understanding the factors that affect how messages are received and how information is diffused through groups and networks to affect individual behavior (Niemic et al., 2021).

Trustees, trust managers, practitioners, and other and stewards of wildlife resources who carefully consider the sociocultural context for application of management decisions (Larson et al., 2014) are likely to be more effective. Mutualistic wildlife value orientations, or the belief that wildlife have inherent value regardless of their usefulness to humans, were positively associated in my research with support for conservation funding policies and engagement in stewardship behaviors. Demographic trends indicate that mutualistic values are becoming more prevalent in society as increasing urbanization, ethnic diversity, and social norms reshape the preferences and attitudes of the public toward wildlife (Manfredo et al., 2009). Mutualist orientations toward wildlife are indicative of modernization in contemporary cultures, reflecting expansion of democratic values and other normative shifts toward greater public participation in governance (Inglehart & Baker, 2000; Manfredo et al., 2020). Consequently, urban residents with mutualistic values are likely to be a growing segment of wildlife stakeholders who are increasingly likely to support wildlife protection strategies more so than consumptive uses of wildlife associated with historical utilitarian perspectives (Teel & Manfredo, 2010).

Given these trends, it is important for the wildlife profession to understand the values of stakeholders to anticipate where conflict may arise. If the past is an indicator of the future, conflicts over legitimate uses of wildlife, lethal control measures, wildlife disease, tolerance for predators, and human-wildlife interactions will continue to shape discussions about the role of

wildlife management and conservation in society. Some conflicts in wildlife management might be alleviated with improved alignment between decisions made by trustees and the goals and values of those affected by decisions (i.e. stakeholders). Various approaches for increasing goal and value-alignment exist, including participatory methods for seeking stakeholder input, explicit integration of normative frameworks in decision making processes, inclusion of social data, and adaptive management of social and environmental impacts resulting from decisions (Patterson & Williams, 1998; Riley et al., 2003; Bennett et al., 2017). Nonetheless, the circumstances under which public participation leads to positive social or environmental outcomes are still uncertain (Eaton et al., 2021), making this topic an imperative avenue for future research.

Management of wildlife as a public trust resource is likely to attain greater relevance among broader constituencies when institutions are accountable, adaptive, and responsive to the needs of beneficiaries with diverse sets of values, priorities, and motivations (Jacobson et al., 2010; Decker et al., 2016). Moreover, increased capacity for shared governance and collaborative decision-making can improve wildlife management outcomes by more effectively utilizing existing resources and incorporating stakeholder participation in decision processes (Rudolph et al., 2012). It is encouraging that conservation leaders and coalitions recognize the need for both increased responsiveness to broader constituencies and diversified funding for conservation and management in practice (AFWA, 2019). However, defining objectives and meeting the expectations of an expanding diversity of beneficiaries will continue to necessitate building capacity for collection of social and biological data, presenting a clear role for human dimensions research in developing integrative frameworks for management, conservation, and stakeholder engagement.

Limitations

All scientific research requires methodological choices that have strengths and weaknesses. Generalizability of my interviews and survey findings is limited by the sample population from which I obtained my data. In-depth interviews necessarily rely on small sample sizes for the purpose of understanding phenomena and its particular context rather than generalizing (Carminati, 2018). My interview participants should not be considered representative of broader populations involved with birdwatching and mountain biking. Use of in-depth interviews was selected based on the potential to gain a rich understanding of birding and mountain biking experiences from the perspective of insiders in the community. Other methods (e.g., semi-structured interviews) used standardized lists of questions to ensure certain topics (e.g., conservation) are discussed in each interview. Such methods, however, tend to emphasize research objectives, potentially at the expense of understanding interviewees' perspectives and revealing unexpected insights. Additionally, the active participation of the researcher as an interviewer introduces the potential for inadvertent bias through question framing, body language, and responses to interviewee statements (Rubin & Rubin, 2012). All possible precautions were taken in anticipating and reducing potential bias in the interviews and subsequent analysis through multiple methods of seeking reliability, validity, and inter-coder agreement (Drost, 2011).

Although I received a large sample of responses from my web-based survey of MDNR recreationists, some limitations in understanding the sample population should be noted. First, no standardized mechanism exists for entering the MDNR database from which the sample was drawn; individuals can be included after registering for a campsite, buying a fishing or hunting license, paying for a recreation passport, or signing up directly on the MDNR website.

Accordingly, demographic information is collected in some instances and not others, making non-response bias difficult to assess directly. Survey recipients were also presumably predisposed to be attentive to issues of wildlife, conservation, and outdoor recreation due to their presence in the MDNR e-mail database, and their perspectives likely reflect those of highly specialized recreationists rather than the general public. The potential for non-response bias was assessed by comparing early and late responders based on the “continuum of resistance” model, which suggests that late respondents and non-respondents often share similar characteristics (Lin & Schaeffer, 1995). Comparison of early and late survey respondents indicated that non-respondents may have been less specialized in their primary recreation, more likely to be female, and more likely live in a rural area. The survey sample was also not representative of the ethnic diversity found in the general population, and as such important issues related to equity and inclusion in outdoor spaces were not able to be addressed by this study.

Additionally, the choice of survey mode can influence the data collected and introduce response bias (Bell et al., 2011; Mayr et al., 2012). The rapidly increasing use of web-based surveys, due primarily to convenience and cost, have prompted concerns regarding sample validity, bias, and unverified respondents (Duda & Nobile, 2010). Technological advancements in internet survey platforms and increasing proportions of the public with internet access alleviate many prior concerns regarding problems specific to internet surveys. Nonetheless, unverified respondents were detected during my survey period. Potentially due to lack of control over the survey sample and large sample size, I was initially unable to ensure that only respondents within the MDNR e-mail database received the survey link. I subsequently added additional screening questions to the survey to filter responses from those who received the survey link from external sources. Although mitigating measures were put in place as soon as the

problem was detected, it is unknown how many surveys were completed in the interim timeframe by recipients outside the MDNR e-mail system.

Finally, it should be noted that phase 2 data collection, including implementation of the web-based survey, was conducted during the Covid-19 pandemic of 2020. It is not currently known how the unprecedented global health emergency may have influenced responses to surveys.

Future research

Continued efforts to understand wildlife stakeholders and the myriad ways in which governance frameworks and management can incorporate human dimensions insights will be a critical component of successful wildlife conservation. Future research that aims to clarify relationships between stakeholder support for conservation and aspects of individuals (e.g., values and attitudes) and groups (e.g., social norms, identity) at multiple scales [e.g., micro, meso, macro (Larson et al., 2014)] will lead to better informed decisions about new models of funding for conservation. Following my research, next steps might include analysis of ways potential programs or sources of information influence social norms to encourage conservation ethics. Additionally, longitudinal studies or forced-choice experiments may illuminate how stakeholder perceptions and behavioral intentions change over time or in response to available trade-offs and alternatives. Models of conservation support would be strengthened by consideration of additional covariates to gauge trust in agencies or institutions, moral or altruistic factors that shape behaviors, and the understudied role of emotion in affecting conservation related behaviors (Jacobs, 2012). The role of affect in conservation messaging, combined with place-based understanding of recreational motivations and pro-environmental behaviors, may prove to be a key component of effective conservation promotion strategies.

Future research may also address some of the sampling and methodological limitations mentioned above. Different sampling strategies might improve the ability to directly assess non-response bias, thus enabling greater confidence in inferences. Certain goals, such as assessing support among the public for specific conservation policies, might necessitate sampling the general public instead of those with a pre-existing interest in natural resources as reflected by those present in the MDNR e-mail database. The distinction, however, between those who are predisposed to be attentive to relevant issues and the general public may be of interest depending on specific research questions and objectives. Additionally, specifically sampling populations of ethnic minorities regarding their participation in nature-based recreation and associated values and motivations would inform discussions of equity in management of recreational opportunities.

APPENDICES

APPENDIX A: IRB approval and consent forms

MICHIGAN STATE **U N I V E R S I T Y**

EXEMPT DETERMINATION

November 13, 2018

To: Shawn J Riley

Re: **MSU Study ID:** STUDY00001445
Principal Investigator: Shawn J Riley
Category: Exempt 2
Exempt Determination Date: 11/13/2018

Title: Investigating social and demographic dynamics of outdoor nature-based recreationists in Michigan and their potential to support wildlife conservation efforts

Grant Title: "Exploring causal factors and effects of declining hunter participation in Michigan" (IP # 00121847)
Sponsor: Michigan Dept. of Natural Resources
Status: Funded

This study has been determined to be exempt under 45 CFR 46.101(b) 2.



**Office of
Regulatory
Affairs
Human Research
Protection Program**

4000 Collins Road
Suite 136
Lansing, MI 48910

517-355-2180
Fax: 517-432-4503
Email: irb@msu.edu
www.hrpp.msu.edu

Principal Investigator (PI) Responsibilities: The PI assumes the responsibilities for the protection of human subjects in this study as outlined in Human Research Protection Program (HRPP) Manual Section 8-1, Exemptions.

Continuing Review: Exempt studies do not need to be renewed.

Modifications: In general, investigators are not required to submit changes to the Michigan State University (MSU) Institutional Review Board (IRB) once a research study is designated as exempt as long as those changes do not affect the exempt category or criteria for exempt determination (changing from exempt status to expedited or full review, changing exempt category) or that may substantially change the focus of the research study such as a change in hypothesis or study design. See HRPP Manual Section 8-1, Exemptions, for examples. If the study is modified to add additional sites for the research, please note that you may not begin the research at those sites until you receive the appropriate approvals/permissions from the sites.

Change in Funding: If new external funding is obtained for an active study that had been determined exempt, a new initial IRB submission will be required, with limited exceptions.

Reportable Events: If issues should arise during the conduct of the research, such as unanticipated problems that may involve risks to subjects or others, or any problem that may increase the risk to the human subjects and change the category of review, notify the IRB office promptly. Any complaints from participants that may

change the level of review from exempt to expedited or full review must be reported to the IRB. Please report new information through the study's workspace and contact the IRB office with any urgent events. Please visit the Human Research Protection Program (HRPP) website to obtain more information, including reporting timelines.

Personnel Changes: After determination of the exempt status, the PI is responsible for maintaining records of personnel changes and appropriate training. The PI is not required to notify the IRB of personnel changes on exempt research. However, he or she may wish to submit personnel changes to the IRB for recordkeeping purposes (e.g. communication with the Graduate School) and may submit such requests by submitting a Modification request. If there is a change in PI, the new PI must confirm acceptance of the PI Assurance form and the previous PI must submit the Supplemental Form to Change the Principal Investigator with the Modification request (available at hrpp.msu.edu).

Closure: Investigators are not required to notify the IRB when the research study can be closed. However, the PI can choose to notify the IRB when the study can be closed and is especially recommended when the PI leaves the university. Closure indicates that research activities with human subjects are no longer ongoing and have stopped. This means there is no further interaction or intervention with human subjects and/or no further analysis of identifiable private information.

For More Information: See HRPP Manual, including Section 8-1, Exemptions (available at hrpp.msu.edu).

Contact Information: If we can be of further assistance or if you have questions, please contact us at 517-355-2180 or via email at IRB@msu.edu. Please visit hrpp.msu.edu to access the HRPP Manual, templates, etc.

Exemption Category. Please see the appropriate research category below from 45 CFR 46.101(b) for full regulatory text. ¹²³

Exempt 1. Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

Exempt 2. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Exempt 3. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of

public behavior that is not exempt under paragraph (b)(2) of this section, if: (i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.

Exempt 4. Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

Exempt 5. Research and demonstration projects which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine: (i) Public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.

Exempt 6. Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

¹Exempt categories (1), (2), (3), (4), and (5) cannot be applied to activities that are FDA-regulated.

²Exemptions do not apply to research involving prisoners.

³Exempt 2 for research involving survey or interview procedures or observation of public behavior does not apply to research with children, except for research involving observations of public behavior when the investigator(s) do not participate in the activities being observed.

Research Participant Information and Consent Form

You are being asked to participate in a research study. Researchers are required to provide a consent form to inform you about the research study, to convey that participation is voluntary, to explain risks and benefits of participation, and to empower you to make an informed decision. You should feel free to ask the researchers any questions you may have.

Study Title: Outdoor recreation and the changing social landscape of wildlife conservation in Michigan: Perspectives and experiences

1. PURPOSE OF RESEARCH

The purpose of this research study is to gain an understanding of the perspectives and experiences of Michigan's outdoor recreation population with respect to the potential of these groups to support wildlife conservation efforts through non-traditional means.

2. WHAT YOU WILL DO

You are being asked to participate in an interview. Your participation will provide valuable data regarding outdoor recreationists in Michigan. You are free to skip any questions that you would rather not answer, and you do not have to provide any private information that you do not wish to disclose. Participation is completely voluntary, and you may discontinue the interview at any time without penalty.

3. POTENTIAL BENEFITS

You will not benefit personally from being in this study. However, we hope that, in the future, other people might benefit from this study because outdoor recreation is an important part of life in Michigan, and the institutions and organizations that manage our lands, waters, and wildlife depend on information from people like you to make sound management decisions.

4. POTENTIAL RISKS

There are no foreseeable risks to participation in this research study.

5. PRIVACY AND CONFIDENTIALITY

Consent forms and data obtained will be kept in a secure location for the duration of the study (and potentially longer in compliance with Michigan State University policies). Security measures are in place to ensure that no identifiable information is connected to the data. Your information will remain confidential.

6. YOUR RIGHTS TO PARTICIPATE, SAY NO, OR WITHDRAW

You have the right to say no to participate in the research. You can stop at any time after it has already started. There will be no consequences if you stop and you will not be criticized. There will be no penalty for refusal to participate in this study.

7. COSTS AND COMPENSATION FOR BEING IN THE STUDY

There are no costs to you and you will not receive compensation for participation in this study.

8. CONTACT INFORMATION

If you have any questions about the study, please contact Dr. Shawn Riley at rileysh2@anr.msu.edu or Chris Henderson, Ph.D. candidate, at hende410@msu.edu. If you have any questions or concerns about your rights in this research study, please contact the Michigan State University Institutional Review Board (IRB) Human Research Protection Program at 517-355-2180 or access the website at <https://hrpp.msu.edu/>.

9. INTERVIEW AUDIOTAPING CONSENT

- *Interviews will be audiotaped and transcribed. Pseudonyms will be used where appropriate and no identifiable information will be connected to your responses. Tapes will be stored in a secure, locked room on Michigan State University campus in accordance with MSU's policies. Electronic files will be kept in password protected folders on a secured campus computer.*
 - I agree to allow audiotaping/videotaping of the interview.

☐ Yes

☐ No

Initials _____

APPENDIX B: Interview guide

Interviewer: Chris Henderson

Interviewee:

Date/Time:

Location:

Notes:

Introduction

Thank you for taking the time to meet with me today to talk about your experiences as a (birdwatcher/mountain biker). As you know, I'm conducting research as part of my PhD program at Michigan State, and I'm interested in hearing from recreationists like you about a variety of topics. The goal is to get a better understanding about what recreationists value about nature. There are no right or wrong answers, I'm more interested in your experiences and perspectives. However, if at any point you are uncomfortable, you can decline to answer or stop the interview at any time.

Review Consent Form

Questions

Tour question:

- 1) To begin, can you tell me a bit about your background as a (birdwatcher/mountain biker), and describe how you got started?

- *Possible follow-up questions:*

- ◆ Where do you usually go? Who do you typically go with?
- ◆ How much time do you spend on average?
- ◆ What's it like when you're on the trail?
- ◆ Do you recall how you felt after the first time you went birding?
- ◆ Who were you with?
- ◆ Did you immediately want to participate again, or did you think it was a one-time event?
- ◆ What led you to continue participating?

Main questions:

- 2) How important is the social aspect of (birdwatching/mountain biking) to enjoyment/success?
 - a. Is there a (birdwatching/mountain biking) "community"? Do you feel like you're a part of it? Why or why not?
 - ◆ *(If yes)* When did you start to really feel like you were a part of the (birdwatching/mountain biking) community?

- What does being a part of the community mean to you?
 - ◆ (If no) What do you think it means to be a (birdwatcher/mountain biker)? Is there more to it than just going (birdwatching/mountain biking)?
 - ◆ Why do you think (birdwatchers/mountain bikers) have formed this type of community?
- 3) Where do you go most often to (look for birds/mountain bike)?
- ◆ What characteristics do you like about this area? Why this place over others?
 - Is it simply a matter of proximity?
 - What kinds of barriers do you see that make it harder to go (birdwatching/mountain biking)?
 - Or easier in some places vs. others?
 - Are there things that could be improved about this area to make it more appealing to (birdwatchers/mountain bikers)?
- 4) Do you know who manages the land that you go birding on most frequently?
- a. Do you think the agency that manages (*location*) is responsive to your needs as a (birdwatcher/mountain biker)?
 - What other activities do you see people participating in?
 - Do you think other activities get a higher priority?
 - (*Further probes for examples/needs/thoughts on mgmt. if applicable*) I want to follow up a bit more on this idea of land management...
 - What role do you think management agencies like the DNR have in providing opportunities for (birdwatching/mountain biking)? What about other types of outdoor recreation?
- 5) Have you ever taken any stewardship action in support of this area or others? (Examples might include volunteer trail maintenance, attending a public meeting, etc.)
- Have you joined or thought about joining any non-profit conservation organizations because of your interest in (birdwatching/mountain biking)?
- 6) Have you ever seen any *other* wildlife (i.e. not birds) while birding? Did it affect your experience? In what way(s)?
- ◆ Does knowing that wildlife may be present affect your mountain biking experience? In what way(s)?

- ◆ Is seeing wildlife a factor that motivates you to go (birdwatching/mountain biking)? Why or why not? What's important/not important about wildlife to your recreation experience?

Closing questions:

- Is there anything else that I haven't asked that you think would add to the discussion?
- Do you have any questions for me?

Conclusion

Thank you again for taking the time to chat with me. As I review my notes and recording, would it be OK if I contact you with any follow up questions or clarifications that might be needed? I'd be happy to share the transcript with you to ensure your answers are represented accurately.

APPENDIX C: Web-based questionnaire of nature-based recreationists

Title Page

Connecting to the Great Outdoors: A Survey of Nature-Based Recreationists in Michigan



Consent Form

Consent Form

Connecting to the Great Outdoors: A Survey of Nature-Based Recreationists in Michigan

Purpose of the study:

Understand the experiences, motivations, and beliefs of nature-based outdoor recreationists in Michigan.

Principal researchers:

Dr. Shawn Riley, Professor of Wildlife Management

Chris Henderson, Doctoral research associate

Background:

You are being asked to participate in a research study of nature-based outdoor recreationists in Michigan. The survey should take only about 15 minutes to complete. You must be 18 years or older and a Michigan resident to participate.

Risks and Benefits:

There are no foreseeable risks to participating in this survey. You will not receive compensation for participating. We hope that insights gained from this research will help state and federal agencies who manage public lands to more effectively allocate resources and provide quality outdoor experiences for everyone in the future.

Confidentiality:

Your participation in this study is completely voluntary. You may choose to not participate, skip any questions you do not wish to answer, or discontinue the survey at any time. Data will only be analyzed and reported in aggregate form – No individual identifiers of any kind will be reported. Responses to this survey will be confidential and no identifying information will be linked to your responses after you complete the survey.

Contact information:

For any questions regarding the scientific nature of the study, please contact Chris Henderson, doctoral research associate, at hende410@msu.edu.

If you have any questions or concerns about your role or rights in this study, you may contact Michigan State University's Human Research Protection Program (<https://hrpp.msu.edu>) by phone at 517-355-2180, fax at 517-432-4503, e-mail irb@msu.edu, or regular mail at 4000 Collins Road, Suite 136, Lansing, MI, 48910.

Consent:

By clicking the button below, you indicate your voluntary agreement to participate in this online survey.

- ☐ I consent
- ☐ I do not consent

Specialization

Thank you for your help in this effort to learn more about nature-based recreationists in Michigan. Michiganders participate in all sorts of outdoor recreation for a variety of reasons and we are interested in your experiences and perspectives. The following series of questions will ask you about your participation in several types of outdoor recreation activities, the places you like to go to

recreate, as well as issues regarding wildlife and conservation that may be important to you.

Please indicate all of the nature-based activities in which you have participated during the past 12 months. (Please select all that apply).

- ☐ Adventure sports (climbing, surfing, etc.)
- ☐ Birdwatching
- ☐ Camping
- ☐ Canoeing/Kayaking
- ☐ Cycling/Mountain biking
- ☐ Fishing
- ☐ Hiking
- ☐ Hunting
- ☐ Jogging/running (including trail running)
- ☐ Motorized recreation activities (Snowmobiling, ATV's, boating, etc.)
- ☐ Skiing (Cross-country, downhill, etc.)
- ☐ Wildlife viewing/photography
- ☐ None of the above

For your nature-based activities which you identified above, please click (or press) and drag to rearrange those activities in order of their importance to you, with 1 being most important:

- » Adventure sports (climbing, surfing, etc.)
- » Birdwatching
- » Camping
- » Canoeing/Kayaking
- » Cycling/Mountain biking
- » Fishing

- » Hiking
- » Hunting
- » Jogging/running (including trail running)
- » Motorized recreation activities (Snowmobiling, ATV's, boating, etc.)
- » Skiing (Cross-country, downhill, etc.)
- » Wildlife viewing/photography
- » None of the above

For purposes of this questionnaire, the activity you ranked number 1 above is your “primary recreation activity”. We are interested in your experiences with this type of recreation, including how often you participate, where you go to do it, and how it affects your daily life. For the following questions, please think about your primary recreation activity and answer accordingly:

How often did you participate in your primary recreation activity in the past 12 months?

- ☐ Less than 1 day
- ☐ 1-9 days
- ☐ 10-19 days
- ☐ 20-29 days
- ☐ 30 or more days

Approximately how many total years of experience do you have in the primary recreation activity you identified above?

- ☐ Less than 1 year
- ☐ 1-5 years
- ☐ 6-10 years
- ☐ 11-20 years

☐ More than 20 years

How would you rate your skill level in your primary recreation activity compared to other participants?

- ☐ **Beginner:** I am often uncertain or unsure of what I can do while participating in this activity, or how to do it.
- ☐ **Intermediate:** I am still in the process of learning, but becoming more comfortable with my primary recreational activity.
- ☐ **Advanced:** I have become comfortable with this activity. I have regular, routine and predictable experiences. I have a good understanding of what I can do while recreating, and how to do it.
- ☐ **Expert:** I have moved beyond the advanced stage. I am a facilitator for this type of recreation. I encourage, teach and enhance opportunities for others who are interested in the activity.

Motivations

People are motivated to recreate for a variety of reasons. How important are the following factors in your decision to participate in your primary recreation activity?

	Not important	Somewhat important	Moderately important	Very important
Spend time with my family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Be with friends.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stay physically fit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Experience solitude.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Share my skill and knowledge with others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learn about wildlife and nature.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Help others develop outdoor skills and knowledge.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improve my skills and knowledge.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Get outdoors and enjoy nature.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Not important	Somewhat important	Moderately important	Very important
Interact with wildlife.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Challenge my skills and abilities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Escape from everyday problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Meet people who share my interests.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please indicate the extent to which you agree or disagree with the following statements about your participation in your primary recreational activity:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
My primary recreation activity has a central role in my life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I identify as a member of the community involved in my primary recreational activity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My immediate social circle typically revolves around participation in my primary recreational activity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I own a lot of gear or equipment related to my primary recreational activity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My family supports my participation in my primary recreational activity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I encourage others to join in my primary recreational activity and seek to ensure the activity persists in the future.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Recreation Behavior

Please tell us how often you have participated in any of the following activities in the past 5 years:

	Never	Rarely	Occasionally	Often	Very often
Participated as an active member of an outdoor recreation group, club, or organization.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Volunteered my personal time and effort for recreational improvement projects (e.g., trail building or maintenance).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contributed money to support development of local recreational facilities or services.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Voted to support a bond or initiative that benefits local parks or recreation facilities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Written a letter to government officials to advocate for policies that affect outdoor recreation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Talked to others about outdoor recreation issues.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Recreation Place

The places we choose to recreate are important for many reasons. Reflecting back over the past year, consider the places you have engaged in your primary recreation activity. Please click or tap on the map below in the general area where you recreated most frequently in the past 12 months. When you place your marker and click or tap, a **red dot** will appear on the map indicating your primary recreation area. You can move this dot as much as you'd like, but you can only choose one area:



Regarding the area in which you primarily recreate (the area you selected above), please indicate the extent to which you agree or disagree with the following statements about that area:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The area where I recreate most frequently is the best place for what I like to do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This area is simply the most convenient for what I like to do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get more satisfaction out of visiting this area than any other.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would not substitute any other area for doing what I do here.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I think often about going to the area.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am strongly attached to this area.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I identify strongly with this area.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This area means a great deal to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel like I can really be myself when I visit this area.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Management - Recreation

The following statements represent some peoples' opinions on management of recreational opportunities. Please indicate the extent to which you agree or disagree with each statement.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I usually can access the areas that I want to for my primary recreational activity without much trouble.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I usually experience little disturbance from other recreational users.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I usually feel safe and secure when I participate in my primary recreational activity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Current management usually provides a diversity of opportunities for my primary recreational activity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Having a variety of wildlife habitats is important for me to enjoy my primary recreational activity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Seeing a diversity of wildlife enhances my recreational experience.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improving wildlife habitat is more important than providing recreational opportunities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
An appropriate balance currently exists between management for hunting and non-hunting recreational opportunities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Value Orientations

The following statements represent some peoples' opinions about nature and wildlife. Please indicate the extent to which you agree or disagree with each statement.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Nature has as much right to exist as people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wildlife have inherent value, above and beyond their utility to people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wildlife are only valuable if people get to utilize them in some way.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Humans should manage fish and wildlife populations so that humans benefit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Animals should have rights similar to the rights of humans.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I personally feel a strong emotional bond with wild animals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The needs of humans should take priority over the needs of fish and wildlife.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I care about wild animals as much as I do other people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People who want to legally hunt should be provided the opportunity to do so.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hunting does not respect the lives of animals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is acceptable for people to kill wildlife if they think it poses a threat to their property.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is acceptable for people to kill wildlife if they think it poses a threat to their life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Community

The places where we live can have an impact on the kind of recreating we do. For the following statements, please think about the area where you currently live and respond accordingly by indicating the extent to which you agree or disagree with each statement.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I know my neighbors well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I frequently interact with my neighbors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel a strong sense of belonging in my local neighborhood and community.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I frequently get involved in local community activities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In general, I share the same values with people in my local community.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Most people in my local community think it is important to protect the natural environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Most people in my local community engage in activities that help protect the natural environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is no point doing what I can for the natural environment unless others do the same.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is too difficult for someone like me to do much to improve the natural environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Conservation

Some people belong to a variety of organizations while others do not. Are you or have you been a member of any of the following organizations in the past 5 years? Select all that apply.

- ☐ National/international environmental or conservation organization (e.g., The Nature Conservancy, National Wildlife Federation, Sierra Club, World Wildlife Fund)
- ☐ National hunting-related conservation organization (e.g., Ducks Unlimited, National Wild Turkey Federation, Quality Deer Management Association)
- ☐ Local/regional conservation organizations (e.g., Clinton River Watershed Council, Six Rivers Land Conservancy)

- ☐ Birding, birdwatching, or bird conservation group (e.g., American Birding Association, National Audubon Society, local Audubon chapter)
- ☐ Fishing conservation organization (e.g., Trout Unlimited, B.A.S.S.)
- ☐ Mountain biking organization (e.g., Michigan Mountain Bike Association, local MBA chapter)
- ☐ Hiking groups (e.g., North Country Trail Association)
- ☐ Equestrian or horseback riding organization

Please indicate how often you participated in the following conservation-related activities during the past 5 years:

	Never	Rarely	Occasionally	Often	Very often
Made my yard or my land more desirable to wildlife.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Volunteered my personal time and effort for wildlife habitat improvement projects on public land.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Voted to support a policy or regulation that supports wildlife conservation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participated as an active member in a wildlife conservation group.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contributed money to a wildlife conservation organization.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attended meetings about wildlife conservation issues.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contacted elected officials or government agencies about wildlife conservation issues.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Talked to others about wildlife conservation issues.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Conservation funding

Funding is important to achieve conservation goals desired by people in Michigan. Which of the following best depicts the primary mechanism for funding wildlife and habitat conservation in our state?

- ☐ Funds from the sale of hunting and fishing licenses and equipment
- ☐ Funds from normal state income and property taxes
- ☐ Private donations
- ☐ Access permits and fees
- ☐ Other (please specify)
- ☐ I don't know

Public lands (e.g. state parks and forests, state game areas, etc.) in Michigan are managed with funds from a variety of sources. However, funds received from hunting and fishing licenses and equipment have generally been on the decline. The statements below represent strategies other states have adopted to provide money for fish and wildlife conservation, which helps maintain or increase access to hunting, fishing, and other recreational opportunities on public lands. Please tell us how likely you would be to support these strategies if they were implemented in Michigan in the future:

	Strongly oppose	Somewhat oppose	Neither oppose nor support	Somewhat support	Strongly support
Dedicate a portion of state sales tax to conservation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dedicate a portion of state lottery proceeds to conservation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Institute a "backpack tax" on outdoor gear (hiking gear, kayaks, tents, bikes, etc.) and use the proceeds to fund conservation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly oppose	Somewhat oppose	Neither oppose nor support	Somewhat support	Strongly support
Increase use of access fees and permits to access certain public lands.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Require a hunting or fishing license purchase to access certain public lands.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Companies that profit from natural resource extraction (oil/gas, timber, etc.) contribute a portion of their annual revenue to conservation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Below are some actions that you could do to help provide funds for fish and wildlife conservation in Michigan. Some of these are currently available while others are only being considered and may or may not be proposed in the future. Please tell us how likely you would be to engage in these actions if they were available in the future:

	Not likely	Somewhat likely	Moderately likely	Very likely
Purchase a Federal Migratory Bird Hunting and Conservation Stamp (Federal Duck Stamp)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Purchase a Migratory Songbird Conservation Stamp	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Purchase a Michigan Recreation Passport	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participate in a fish or wildlife conservation fundraising event	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Optional donation to fish and wildlife conservation when purchasing outdoor gear (hiking gear, kayaks, tents, bikes, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Not likely	Somewhat likely	Moderately likely	Very likely
Vote for state or local bonds that contribute to fish and wildlife conservation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Demographics

Now, please tell us a little bit more about yourself.

In what year were you born? (Please enter the four-digit year, e.g. "1965")

What is your gender?

- ☐ Female
☐ Male
☐ Non-binary
☐ Prefer to self-describe:
☐ Prefer not to answer

Are you of Hispanic, Latino, or of Spanish origin?

- ☐ Yes
☐ No
☐ Prefer not to answer

How would you describe yourself? (Select all that apply)

- ☐ American Indian or Alaska Native
☐ Asian

- ☐ Black or African American
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ White
- ☐ Other
- ☐ Prefer not to answer

In which Michigan county do you currently reside?

Which of these categories best describes the place where you live now? Select one.

- ☐ Large urban area (population 500,000 or more)
- ☐ Medium urban area (population between 50,000 and 500,000)
- ☐ Small city (population between 10,000 and 50,000)
- ☐ Small town (population between 2,000 and 10,000)
- ☐ Rural area (population less than 2,000)
- ☐ Prefer not to answer

What is your current yearly household income?

- ☐ Less than \$24,999
- ☐ \$25,000 to \$49,999
- ☐ \$50,000 to \$74,999
- ☐ \$75,000 to \$99,999
- ☐ \$100,000 to \$149,999
- ☐ \$150,000 to \$199,999
- ☐ Over \$200,000
- ☐ Prefer not to answer

What is the highest degree or level of school you have completed? (If you're currently enrolled in school, please indicate the highest degree you have received.)

- ☐ Less than a high school diploma
- ☐ High school degree or equivalent (e.g. GED)
- ☐ Some college, no degree
- ☐ Associate degree (e.g. AA, AS)
- ☐ Bachelor's degree (e.g. BA, BS)
- ☐ Master's degree (e.g. MA, MS, MEd)
- ☐ Professional degree (e.g. MD, DDS, DVM)
- ☐ Doctorate (e.g. PhD, EdD)
- ☐ Prefer not to answer

How did you hear about this survey?

- ☐ E-mail from the Michigan Department of Natural Resources (MDNR)
- ☐ Friends or family
- ☐ Social media (e.g. Facebook, Twitter)
- ☐ Search engine (e.g. Google)
- ☐ Work or school
- ☐ Other (Please specify)

Thank you for participating in this online survey! Pressing the "Next" button will complete the survey and submit your responses. If you have any other thoughts you would like us to know, please use the text box below.

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