

AN ABSTRACT OF THE THESIS OF

Elliott Chad Finn for the degree of Honors Baccalaureate of Science in Biology and Environmental Economics, Policy, and Management presented on March 12th, 2014.
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Abstract Approved: _____

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Some evidence suggests a connection between outdoor recreation participation and stronger environmental worldviews. This study finds little evidence supporting participation in outdoor recreation activities and stronger environmental worldviews and some evidence supporting a weak connection between appreciative outdoor recreation and stronger environmental worldviews. Additionally, the study documents greater participation in outdoor recreation amongst rural residents compared to urban residents and significantly different activity type preference. The study develops two more robust measures, one for surveying the total amount of outdoor recreation individuals participating in and another to develop a lifetime measure of size of place.

Key Words: Outdoor, Recreation, Environmental, Worldview, Rural

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Investigating Relationships between Outdoor Recreation Activities, Environmental
Worldviews, and Place of Residence.

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I understand that my project will become part of the permanent collection of Oregon State University, University Honors College. My signature below authorizes release of my project to any reader upon request.

Elliott Chad Finn, Author

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Individuals are products of communities and this thesis product is the product of a vast interconnected community. I want to first and foremost thank my parents for teaching me how to love and respect nature and how to fully appreciate the myriad opportunities to engage in outdoor recreation. They nurtured an internal desire to learn about the natural world and problems, which gave me the foundation necessary to complete a thesis.

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This thesis is dedicated to the people who
first introduced me to the outdoors,
thanks Mom and Dad.

Investigating Relationships between Outdoor Recreation Activities, Environmental Worldviews, and Place of Residence.

Introduction

Aldo Leopold wrote of the joys of fishing and hunting on his farm in the Sand Hills of Wisconsin. Leopold embraced the excitement of the hunt and the rush of hooking a fish and described his experiences with incredible detail. His passions for outdoor recreation brought him into nature, hiking across his lands, canoeing down the lower Colorado River, and horseback riding in the New Mexican wilderness. Combined with his keen eye for observation and scientific method he tied his experiences to a new paradigm of ecosystem management. Leopold described a land ethic in *A Sand County Almanac* emphasizing the importance of every part of an ecosystem, famously writing “A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise” (Leopold, 1949). Leopold’s ideas form the tenets of the newest ethic of environmental management. Most importantly, Leopold’s worldview and values were formed through outdoor recreation. These experiences with nature led Leopold to create the first National Wilderness Area in New Mexico as part of the U.S. Forest Service, preserving a place for nature to exist unencumbered and for people to use as a place for hiking and enjoyment.

Why did Leopold espouse strong environmental values? Was it because of his experiences as a child hunting and fishing, and otherwise spending considerable time in

contact with natural settings? Was it because he participated in outdoor recreation as an adult? Or did he come to his environmental values on his own, and his views on nature informed his outdoor recreational choices? Further, did his largely rural upbringing,ⁱ and extensive time spent in the rural sandhills of Wisconsin, have an effect on his environmental worldview and approach to outdoor recreation? Understanding the connections between worldviews, outdoor recreation and place has become even more important today in the U.S. than in Leopold's day.

This is because growing numbers of individuals in post-industrial societies are embracing environmental values, which means stronger support for environmental protection policies (Inglehart 1990; Kempton et al. 2004). There also has been corresponding, significant growth in "motorized" recreational activities and "appreciative" recreation activities on public lands that depart from traditional "consumptive" activities such as fishing and hunting (Thapa 2010). Key examples of "appreciative" activities include birdwatching, hiking, snowshoeing, and whitewater rafting. Moreover, the balance between rural and urban populations has changed dramatically in the past 80 years, with 80.7% of the population living in urban areas in 2010 versus only 56.1% in 1930 (United States Census Bureau, 1990, 2013).

Research Questions

My undergraduate thesis investigates the relationships between environmental worldviews, outdoor recreation activities, and place of residence and tests three main research questions. First, does youth exposure to nature through outdoor recreation

activities correspond to more pro-environmental worldviews later in life? This question tests the conclusions of a very widely read, and influential book, Richard Louv's (2005), *Last Child In The Woods: Saving Our Children From Nature-deficit Disorder*, across a broad range of outdoor recreational activities. Second, the research digs deeper to see if there is a relationship between environmental worldviews and the frequency of outdoor recreation as well as type of recreational activity? The hypothesis here is that the intensity associated with outdoor activities, expressed by frequency of participation, is likely to be a better measure for this overall relationship between values and choices than current research which typically relies on respondents noting only their favorite activity.

Third, much has been written over the years about the rural-urban divide and how people living in different places tend to hold different values, including their views toward environmental protection. This research explores whether individuals' environmental worldviews and outdoor recreation choices vary based on the size of place they live in, from rural to urban as both children and adults? Yet, as with the research question on environmental values and the frequency of participation, the rural-urban divide is not simply measured by where individuals live currently, which is standard practice. Instead, a range of "ruralness" to "urbanness" is developed across an individual's lifetime in order to provide greater accuracy in a particular respondent's status. The expectation is that those scoring higher on "urbanness" will hold stronger environmental values and will be more likely to choose non-consumptive, appreciative outdoor activities, while those with high "ruralness" will score the opposite.

Before turning to explore these research questions and results in full, the thesis provides background information on the changes observed in outdoor recreation over the

past fifty years, as well as changing environmental worldviews in the U.S. population over the same time frame. As many readers may know, outdoor recreation participation has exploded over the past 50 years, with a corresponding explosion in economic growth in the outdoor recreation industry. More people and different people are using public lands today. Public land managers now need to consider a multitude of recreational constraints in their management practices as well as their traditional focuses on natural resource extraction. These changes have forced public land managers to reconsider how public lands are managed shifting the management paradigm on public federal lands. The explosion in outdoor recreational activities runs in parallel with the growing acceptance by the U.S. public that environmental values, and environmental protection, are an important public policy value to be considered alongside other important public policy values such as economic growth and national security.

Outdoor Recreation Growth, Economics and Public Lands

Since Leopold's time outdoor recreation has become an increasingly important activity for many citizens. Cordell et al. (1999) produced the most extensive and current national report on outdoor recreation participation. Their primary data source was the 1994-1995 National Survey on Recreation and the Environment (NSRE), a survey commissioned by the federal government since 1960. Analyzing long-term trends dating to the first NSRE they determined that since 1960, controlling for changes in population base and general popularity shifts (ie the change in percentage of the population that participate) overall visits to federal sites and areas increased by over 40 percent (Cordell,

Betz, & Bowker, 1999). More impressively, with the same controls on demographic shifts, there were 65 percent more participants in outdoor recreation activities in 1994-1995 as compared to 1960 (Cordell et al., 1999).

Camping participation illustrates the increasing importance of outdoor recreation. A popular activity in 1960, nearly 13 million people aged 12 or older camped one or more times in the preceding year (Cordell et al., 1999). By 1965 nearly 19 million people participated, by 1982-1983 participants tripled, and by 1994-95, 58 million people participated, controlling for population growth, a 350 percent growth in camping over 35 years (Cordell et al., 1999). More people continue to participate in camping, in the most recent NSRE in 2002, 62 million people were estimated to participate in developed camping, 38.4 million in primitive camping, and 24.5 million in backpacking (Cordell, 2002). The 2002 numbers are an underestimate as the most recent NSRE only included respondents over the age of 16, rather than just 12 as in previous iterations of the survey. Camping is becoming an ever more important form of outdoor recreation and many people participate on their federal lands. While camping is only one form of outdoor recreation, the overall trend follows that of camping, with increasing participation.

Much of the increase in outdoor recreation participation over the past 30 years has been in appreciative forms of outdoor recreation (Cordell, 1995). Cordell, Green and Betz (2009) analyzed trends in outdoor recreation from 1982-83 to 2005-2009 data collected from the Nationwide Recreation Surveys (NRS) and found that the fastest growing activities over that time period were walking outdoors (+59.7 million participants), viewing or photographing wild birds (+59.7 million), attending outdoor sports events (+51.6 million), day hiking (+51.0 million), attending outdoor concerts/plays/other events

(+40.9 million), visiting outdoor nature centers (+40.5 million), swimming in natural waters (+38.4 million), sightseeing (+36.8 million), bicycling, running or jogging (34.9 million), and picnicking (+34.2 million). Each of these activities falls into the appreciative outdoor recreation category. The fastest growing activities by percentage for this time period were viewing and photographing birds, growing by 287%, followed by day hiking, backpacking, off-road motor vehicle driving, walking outdoors, and canoeing/kayaking (Cordell, Green, and Betz 2009) see Table 1 for growth rates.

Table 1. Fastest Growing Outdoor Recreation Activities

Activity	Percent Growth (1982-83 to 2005-09)
Viewing and photographing birds	287%,
Day hiking	210%
Backpacking	161%,
Off-road motor vehicle driving,	142%
Walking outdoors	111%
Canoeing/kayaking	106%

All of these activities are appreciative except off-road motor vehicle driving.

While the biggest increases in participation have been in appreciative recreation, both consumptive and motorized outdoor recreation activities have seen participation rates increase, just at slower rates. In later analysis outdoor recreation activities are categorized into specific types and Table 2 below shows how different activities are classified by the literature. In the same Cordell, Green, and Betz (2009) analysis, from 1982-1983 to 2005-2009, motorized and consumptive outdoor recreation activities experienced growth. From the motorized category of outdoor recreation, off road vehicle travel experienced the greatest increase in participation as discussed above. Motorboating (+20.8 million) and snowmobiling (+3.5 million) experienced the next highest percent increases in participation with increases of 63.0% and 67.3% respectively. Consumptive activities also saw growth over the same time period with 19 million more people participating in fishing and 5.8 million more people participating in hunting, increases of

32.2% and 27.9% respectively. Clearly all types of outdoor recreation are growing, with appreciative outdoor recreation experiencing the greatest amount of growth.

Table 2. Types of Outdoor Recreation Activities

Appreciative (see Dunlap & Heffernan, 1975; Hendee, 1969)	Motorized (see Jackson 1986, 1987)	Consumptive (see Dunlap & Heffernan, 1975; Hendee, 1969)
Tent camping, RV/tow-behind trailer camping, hiking, bird or wildlife watching, river rafting or kayaking, canoeing, swimming or playing in lakes, rivers, ocean, backpacking, playing in the woods/forest, cross-country skiing, downhill skiing/snowboarding/telemarking, snowshoeing, windsurfing, surfing, parasailing or hang-gliding, trailrunning, mountain biking, road cycling, outdoor scenic photography, rock climbing, and sledding	Off-road vehicle travel (ATV's; 4-wheel drive vehicles; dune buggies; motorcycles/motocross; etc.), motorboating, waterskiing, motorized parasailing or gliding, and snowmobiling	Fishing (spinners/hardware and/or bait), fly-fishing, hunting (guns), hunting (bow), and collecting (rocks, plants, mushrooms, berries, etc.).

Increasing participation in outdoor recreation means more people spending time outdoors and more people spending money on outdoor activities. The outdoor recreation industry is a growing economic giant. In 1984 direct spending on outdoor recreation first reached and topped \$100 billion (Anderson & Leal, 1988). The most recent comprehensive analysis of how much outdoor recreation contributes to the U.S. economy in 2009, estimated that in 2006-2007, human-powered and wildlife-based outdoor recreation directly contributed at least US\$730 billion dollars to the economy (Associates, 2012; Southwick, Bergstrom, & Wall, 2009). This number does not factor in any kind of ripple effects or multipliers, solely direct spending. Thus the number is probably a conservative estimate.

A multitude of outdoor recreation outfitters have both encouraged and benefitted from this economic explosion. Companies like Patagonia, L.L Bean and REI have grown from small fringe startups and co-ops to international economic titans. These three

companies are part of the 14 founding members of the Outdoor Recreation Coalition of America (now Outdoor Industry Association), founded in 1989. The OIA states that it was founded because companies “realized that “outdoor” was more than just a passing consumer trend,” requiring industry representation (Outdoor Industry Association, 2014). Patagonia was founded in 1972 and had annual sales of \$2 million by 1976; by 1986 annual sales grew to \$24 million, and in 2013 annual sales topped \$575 million (Stevenson, 2012; Stock, 2013). Patagonia is a relatively young company in the outdoor recreation economy compared to L.L Bean. LL Bean was founded in 1911 with a goal of providing a more functional boot for Maine hunters, eventually moving to provide gear for all outdoor pursuits. The company surpassed \$1 million in sales in 1937, then stayed at roughly at the same level of sales for twenty-five years, with annual sales of \$2 million in 1961 (L.L. Bean, 2014). Then outdoor recreation participation exploded, the company boasted annual sales of \$1.52 billion in 2012, a staggering 9,797.47% increase from 1961 sales, accounting for inflation (L.L. Bean, 2013)! Recreational Equipment Cooperative better known as REI started out as a coop of 23 members in 1938 (REI, 2014). At the beginning of 1960, REI had grown to 20,000 members with one retail store and nearly \$500,000 in annual sales, by 1990 membership had grown to 1 million members, with 26 retail stores, and over \$230 million in annual sales (REI, 2014). In 2010, REI expanded to an incredible, 10 million members, 114 retail stores and \$1.66 billion in annual sales (REI, 2014).

In 2012, Sally Jewell, former CEO and president of REI was appointed by President Barack Obama to be the Head of the Department of Interior. This is the first time in the history of the Department of Interior that the head of the department hails

from a background of outdoor recreation--directly from an industry focused on outfitting people for outdoor recreation activities. One result of the burgeoning use of public lands as outdoor recreational destinations is that many public lands have undergone a management paradigm shift; from a focus on extraction towards a focus on more recreation. For example, the Pacific Northwest has served as a battleground for timber development over the past 40 years, increasingly the outcome has been extensive litigation and less timber extraction (Brunson & Steel, 1996). The state of Oregon offers a clear demonstration of this changing value set. Since 1989, timber harvest from public lands has decreased 84.5% (Oregon Department of Forestry, 2012). Focus on resource extraction can depend on the political agenda of the moment but the overall trend has been a decrease in federal land extractive policies- ie less timber harvest, oil and mining permitting.

The Bureau of Land Management (BLM), Forest Service, and Department of Interior each show how this paradigm has shifted. The number of recreation sites that the BLM manages has grown by nearly 700% since 1976, with the agency managing 500 sites in 1976 and nearly 3500 sites by 2007 (Ratcliffe, 2008). Total recreation visits to BLM recreation sites have increased from 45 million in 1990 to 57 million in 2008 (Bureau of Land Management, 2009). Collins and Brown (2007) argue that by the end of the 1990's, the BLM had finally put recreation planning at the forefront of the agency's priorities. Passage of the Federal Land Policy and Management Act (FLPMA) in 1976 started the BLM's shift from a primarily extractive agency to one focused more on environmental protection and outdoor recreation management (Weber and Ley, Forthcoming). Weber and Ley (Forthcoming) argues that mandates stemming from

FLPMA pushed the BLM away from commodity uses and extraction as their only major goals by moving the agency to include a more diverse array of stakeholders in their decision making committees--including scientists, environmentalists, and recreationists instead of traditional ranching and logging interests, mandating protection of public lands in areas of critical concern and introducing wilderness designation as a policy. These policy changes have resulted in 17.3 million acres designated as wilderness study areas and 8.7 million acres designated as wilderness areas, with the uses of these lands restricted strictly to non-impactful recreation (Weber and Ley, Forthcoming).

The United States Forest Service (USFS) was established in 1905 by outdoor recreation enthusiasts, Teddy Roosevelt and Gifford Pinchot, with a stated focus of managing for timber, water and other uses. The early USFS served to provide some outdoor recreation but mostly fire suppression. However, in the early 1920's swaths of USFS land were turned into National Parks, intimating a future of outdoor recreation and preservation that was to come. In 1960 the Multiple Use-Sustained Yield Act explicitly identified outdoor recreation as part of the Forest Service's mission, on equal footing with timber, water, and other uses (Collins & Brown, 2007). Increasing outdoor recreation visits to national forests necessitated this change in the Forest Service mission. In 1924, national forests saw 4,660,300 recreation visits; by 1960 that number grew to 92,594,500 visitor days and by 2009, Forest Service lands experienced an estimated 170,800,000 visitor days (United States Forest Service, 2006; United States Forest Service, 2010). Outdoor recreation is a dominant part of current USFS management.

The Department of the Interior, under which the BLM is housed, espoused a paradigm of utilitarian natural resource development in the 19th century. Wilderness was

viewed as wasted and encouraged to be converted into productive farms and timberlands (Nash 1967). As the turn of the century neared, a conservation ethic began to present itself, with Yellowstone and Yosemite being designated the first National Parks and eventually in 1916, the National Park Service was created to preserve these natural objects and lands for the enjoyment of present and future generations. However, the major departmental management shift did not start until the 1960's with passage of the Wilderness Act of 1964, the National Environmental Policy Act of 1973, and the Federal Land Policy and Management Act of 1976. New restrictions, considerations, and a focus on conservation of lands shifted the DOI away from traditional extractive management (Weber and Ley, Forthcoming).

In 1989 the DOI introduced the Riparian-Wetland Initiative, focusing on preserving natural value of public lands by protecting riparian zones on streams and rivers. These streams were often left to rancher control and the new program strained the traditional management structure that the DOI espoused towards grazing rights and land use, however, by 2008, 87% of BLM riparian zones met the new, more stringent regulations. This exemplifies the new shift towards management for preservation and appreciation. During Clinton's presidency the DOI started the National Landscape Conservation system linking "special areas" hoping to save open spaces for future generations. Taken together, the Bureau of Land Management, Forest Service, and Department of Interior all have each shifted their focus from extraction and added significant new areas of focus concerned with land preservation as well as improving and increasing outdoor recreation opportunities (Weber and Ley, Forthcoming).

Environmental Movements and Changing Worldviews

While outdoor recreation in the U.S. has moved from a common activity focused on a few types of recreation to a widespread set of activities comprising a growing variety of recreational endeavors, there has been a corresponding change in how the public relates to the outdoors and the environment. Many point to the 1960's and early 1970's as the birth of the modern environmental movement (Weber, 1999). Outrage over the perceived and quite visible environmental calamities of the day sparked a chord with the public. Rachel Carson's *Silent Spring* in 1964 is viewed as one of the early benchmarks of the environmental movement, noting the devastating impacts of DDT on birds. Five years later pictures of the Cuyahoga River burning became a national symbol for the need for environmental protection. Further developments like the devastating public health nightmare at Love Canal came to light in 1978. Taken together, events such as these convinced the public that stronger environmental protection was needed. The first Earth Day on April 22nd, 1970 represented the new national consensus- people understood that something was wrong and vast swaths of the public embraced the movement. Environmental groups like the Sierra Club and Audubon society swelled in size. Sierra Club membership alone exploded from 10,000 members in 1956 to 114, 000 members in 1970 with Club chapters in all 50 states (Sierra Club, 2013).

The groundswell of public outrage and opinion resulted in legislative action. The Clean Air Act, the Clean Water Act, and the Endangered Species Act, passed in 1970,

1972, and 1973, respectively, represent some of the largest legislative victories of the environmental movement. Rather unthinkable today, a Republican president, Nixon, signed each of these into existence in addition to the Environmental Protection Agency and the National Environmental Policy Act in 1970. Even more unthinkable; most of these major laws were passed in true bipartisan fashion by congressional supermajorities.

Behind these public events and policy changes, researchers were documenting how people perceived and interacted with these environmental issues. Researchers wanted to explain what was happening. Why were these laws being passed? To begin they started to try and measure where this pro environmental ethic or worldview was coming from. In the early 1970's researchers started using surveys and ethnographic interviews to determine individuals' worldviews and their environmental attitudes. Among these were the New Environmental Paradigm (NEP), Environmental Concern (EC), Roper Scale, Awareness of Consequences (AC), and Forest Values (FV) scale. These scales will be discussed in greater detail later. The general consensus of this work is that growing numbers of individuals in post-industrial societies are embracing pro-environmental worldviews, meaning stronger support for environmental protection policies (Inglehart 1990: Kempton et al. 2004).

Early research in the area focused on "environmental concern," an attempt to measure public concern for environmental quality (Geisler, Martinson, & Wilkening 1977; Dunlap, 2000). The primary focus of this research was a reaction to the visible environmental issues of the day that the Clean Air and Water acts were trying to remedy (Dunlap, 2000). The researchers were measuring how concerned people were over maintaining a clean environment.

Further measures were developed to try and capture the environmental ethic of the day. Berns and Simpson (2009) describe a variety of measures developed in the literature to examine environmental concern or this environmental ethic. One such early measure of environmental worldview was termed environmental attitude; this term was not distinguished from environmental concern and served to measure the same attributes described above (Berns and Simpson 2009). Another measure known as environmental sensitivity has been used in a variety of other studies. Berns and Simpson (2009) p. 81 define this measure as “a set of affective attributes that result in an individual viewing the environment from an empathetic perspective.” Further, Berns and Simpson (2009) note that sensitivity is distinct from concern and attitude as the sensitivity ethic comes from having a specific significant life experience in the outdoors.

Riley Dunlap (2000), drawing on his own research ranging back to the 1970s, developed a different measure of environmental values. He labeled it the new environmental paradigm (NEP), and it became a popular measure of environmental worldviews. Using this measure Dunlap (2000) finds a small increase in support for environmental values among the American public in the years 1976 to 1992. He also speculates that had there been data from the late 1950's and early 1960's, before the environmental decade of the 1970's, that the changes in pro-environmental worldviews would be even more striking.

Connections: Outdoor Recreation and Environmental Attitudes

A multitude of researchers also have documented, or suggested connections between outdoor recreation activities and the environmental attitudes that people have. Dunlap and Heffernan (1975) are generally credited with first suggesting this connection in 1975, finding weak relationships between outdoor recreation participation and environmental concern. Berns and Simpson (2009) note that environmental attitudes or worldviews, are referred to in different ways ranging from environmental concern (see Geisler, Martinson, & Wilkening 1977), to environmental attitude instead of concern (see Dunlap & Van Liere, 1978; Van Liere & Noe, 1981), and to environmental sensitivity (see Chawla, 1998; Bustam, Young, & Todd, 2003). Environmental attitudes, concern and sensitivity each measure the type of environmental worldview that an individual espouses and the differences were discussed earlier.

Research indicates that different types of outdoor recreation are related to different types of environmental worldviews. A few studies support a connection between appreciative outdoor recreation and stronger environmental attitudes (Tarrant and Green, 1999; Dunlap & Heffernan, 1975; Ewert, Place and Sibthorp, 2005). Appreciative recreation refers to lighter impact activities like birdwatching, hiking, snowshoeing, and whitewater rafting (Dunlap & Heffernan, 1975; Hendee, 1969). Thus, research suggests that those who participate in appreciative outdoor recreation are more likely to have more pro-environmental worldviews or conversely, that those with stronger environmental worldviews are more likely to participate in appreciative outdoor recreation. Appreciative outdoor recreation contrasts with activities like hunting and fishing which have been classified as consumptive outdoor recreation activities (see Dunlap & Heffernan, 1975;

Hendee, 1969) and a third classification, motorized, including activities like off road ATV travel and motorboating (see Jackson 1986, 1987). Thapa (2010) noted that some of the inconsistencies in findings with respect to the outdoor recreation participation and environmental attitudes could be due to weak operationalization of outdoor recreation participation and environmental attitudes (Teisl & O'Brien, 2003; Thapa & Graefe, 2003).

Yet, key questions remain. Is there a connection between appreciative outdoor recreation participation and environmental attitudes? Are the increases in appreciative outdoor recreation participation in some way responsible for stronger environmental attitudes? Or is there any connection at all?

Some scholarship supports an “experience first, then environmental values” hypothesis. Wells and Leikis (2006) combine consumptive and appreciative activities into a single category of “wild nature” and find that childhood experiences with wild nature increase the likelihood that people will become environmentalists with strong environmental values. There is evidence that adolescents who played in wilderness areas as children are more likely to prefer wildland walking paths as compared to youth who had mainly played in yards (Bixler, Floyd, Hammitt 2002). Wells and Leikis (2006) argue that this supports the idea of childhood play locations influencing later interests in outdoor recreation, wildlands, environmental preferences, and occupations in the outdoors. Additionally, Kellert (1985) shows that learning through experience with animals results in more appreciation, knowledge, and concern for animals in adolescents as compared to learning in classrooms or at zoos. Outdoor recreation participation could

be this type of outdoor experiential learning that might correspond to stronger pro-environmental worldviews.

Similarly, Louv (2005) argues that general experience with the non-built world, or “nature,” is a key factor in forging a passion to conserve and appreciate nature. Louv (2005) makes a compelling argument for childhood exposure to nature on a multitude of levels, suggesting that outdoor recreation and exposure to the outdoors as a child has significant development and health impacts.

Others, however, point the causation arrow in the opposite direction—the strength of environmental values affect choices of nature-related activities. Tarrant and Green (1999) show a positive relationship between strong environmental values and participation in “appreciative” recreation, while also finding that “the general consensus is that motorized and consumptive activities are unrelated to environmental attitudes.” Thapa (2010) and Cordell, Green, and Betz (2002) also report that differences in environmental worldviews translate into different preferences for types of nature-related recreational activities.

Rural and Urban: The Ongoing Shift, Outdoor Recreation Choices, and Environmental Worldviews

The distribution of the United States population has shifted dramatically over the past 200 years, moving from a predominantly agrarian-rural society towards an urbanized population. In 1830 just 8.8% of the U.S. population lived in urban areas, while 91.2% lived in rural areas (United States Census Bureau, 1990). Nearly one hundred years later, 1920 was the first year when more people lived in urban areas than in rural areas, with

the census recording 51.2% of the country living in urban areas versus 48.8% living in rural areas (United States Census Bureau, 1990). By 1990, 75.2% of the U.S. population lived in urban areas and in the 2010 census, 80.7% of the U.S. population lived in urban areas (United States Census Bureau, 1990; United States Census Bureau, 2013). During the 20th century more people left rural areas than arrived. In the 1970's there was a slight blip in trend which then continued through the 1980's and 1990's with continuing rural population outmigration (Johnson, 2010).

This outmigration and shift has been even more pronounced among farming families. In 1930 when just over 50 percent of the population lived in urban areas, 30 percent of the population lived on farms while roughly 20 percent lived in small villages and rural nonfarm residences (Monkkonen, 1988). By 1980 only 3 percent of the population lived on farms (Monkkonen, 1988). Most of the urban population growth has been in middle sized cities and small metropolises, rather than in large metropolises (Monkkonen, 1988). In fact, from 1800 to 1980 the number of U.S. cities over 10,000 grew 23 percent faster than cities under 9,999 (Monkkonen, 1988). Eric Monkkonen (1988) argues that much of the urban expansion was facilitated by the locally promoted growth of canal and railroad connections. This helped manufacturing cities increase the size of their marketing regions, shifting the advantage to larger manufacturing centers (Monkkonen, 1988). These shifts had dramatic impacts on the make up of the United States; more people now live in urban areas than ever before.

The shift in the U.S. population is important precisely because where one lives can have a significant impact on the types and amount of outdoor recreation activities available to participate in. Living in highly urbanized cities may decrease access to

outdoor areas, while, rural areas with few developed trails or places for outdoor recreation (eg. all private land, or lack of public parks), can limit the types and number of activities available. Johnson et al. (1997) argues that place-identity is a huge part of or one's physical environment and that it is as important as norms, values and beliefs for individual socialization. She argues further that this impacts the types of outdoor recreation activities that urban and rural dwellers participate in (Johnson et al. 1997). Cordell et al. (1999) found that in both metropolitan and nonmetropolitan populations (essentially rural and urban distinctions), walking for leisure was the most popular outdoor recreation activities along with family gatherings and sightseeing, however, activities like hunting fishing and camping were more popular in non metropolitan populations. Overall, metropolitan populations were more likely to engage in outdoor recreation activities (Cordell et al. 1999). Johnson and Cordell (2001) suggest that the lower outdoor recreation participation rates may be due to how these areas have traditionally defined land, leading to less usage despite ample public outdoor recreation land. They suggest that rural dwellers can face more structural and psychological challenges to participation in outdoor recreation than other groups

While Cordell et al. (1999) argue that the sociology literature indicates that urban and rural attitude differences are diminishing due to mass communication, increases in nonagricultural industry and changing rural governments, they also argue that significant rural-urban value differences still exist. Johnson and Cordell (1999) show that urban and rural populations differ in their perceptions and concern for environmental pollutants (Cordell, 1999). Clucas, Henkels, and Steel (2011) argue that a new environmental ethic or paradigm has emerged and that those in urban areas support this ethic. They find that

this new environmental paradigm, coming out of the 1970's has experienced greater support in urban areas and less support in rural areas (Clucas, Henkels, & Steel, 2011). Additionally, they believe that urban residents have significantly different opinions from rural residents regarding natural-resource issues and land-use policy, adopting a less pro-environmental worldview (Clucas et al., 2011).

Implications

Connections between environmental worldviews and outdoor recreation participation are important for policy makers and outdoor recreation. Policy makers need to understand the connections to make solid decisions. Some research suggests that for effective public policy and natural resource management, decision makers must understand the environmental attitudes or worldviews of the people using those natural resources (Manning, Valliere, & Minter, 1996). Moreover, how outdoor recreation activities are related to environmental worldviews is important for a multitude of conservation organizations, environmental advocacy organizations, and public policy makers. Understanding exactly how the two variables interact is crucial for each group to craft messages and encourage results.

With continued migration into urban areas, understanding how place of residence impacts participation in outdoor recreation is important for land managers. If environmental worldviews are connected to early nature experiences as Well's and Lekies (2006) suggest and as the population becomes increasingly urbanized, more or less people may be contacting nature. Simply accessing nature from a highly urban

population center may be difficult for many. Does the size of place children grow up in impact their type and frequency of outdoor recreation activity participation and their environmental worldviews, or is it more important where these same people live as adults? These questions have developmental and health implications for our population. What differences in environmental worldviews and outdoor recreation participation might we predict in the next generation? Why did Leopold espouse a pro-environmental worldview, was it because he grew up outdoors recreating, was it because he participated in outdoor recreation as an adult, and did it matter whether he was living in his town home in Madison or spending time out in the rural Sandhills of Wisconsin¹?

The thesis now turns to explain the research methods before moving to the results sections that examine the relationships, if any, between childhood outdoor recreation activities and the strength of adult environmental values (the Louv hypothesis), and the connection between place of residence and environmental values.

¹ Leopold's hometown of Burlington, Iowa was small, and heavily reliant on a rural agricultural economy during his childhood (Population 836 in 1890); Leopold spent the majority of his adult life in mid-sized Madison, Wisconsin (population 35,000 in 1928).

Research Methods

Research Questions

To assess the research questions (see below), I developed a comprehensive, survey-based approach that examined and explains the relationships between (1) environmental worldviews, (2) outdoor recreation choices and (3) size of place of residency.

Table 3. Research Questions

- | |
|--|
| <ol style="list-style-type: none"> 1. Does youth exposure to nature through outdoor recreation activities correspond to stronger environmental worldviews later in life? 2. Do environmental worldviews influence outdoor recreation choices and frequency of participation and/or the converse? 3. Do peoples environmental worldviews and outdoor recreation choices vary based on the size of place they live in, from rural to urban as both children and adults? |
|--|

The research design tested the relationship between environmental worldviews and the type and frequency of “nature” contact, while also asking if this relationship varies according to residency/place. Environmental values were assessed using the updated, widely applied Dunlap and Van Liere (2000) New Environmental Paradigm (NEP) scale. Urban-rural residency was scaled from small to large, and across time from childhood to adulthood. Type and frequency of nature contact through outdoor recreation was assessed, additionally, across time from childhood to adulthood.

The survey population consisted of a randomized set of 2000 metro and 2000 non-metro addresses from Oregon. This distribution scheme allowed us to split our survey between urban and rural populations, a key study goal. The mail-based survey was administered in multiple waves using the Dillman Total Design Method (Dillman, 1978).

The first wave consisted of a postcard informing residents that they had been selected to participate in the survey and to inform them that a survey would soon be arriving in the mail, followed by the survey packet consisting of a cover letter explaining the project and various rights and privacy considerations, the survey, and a business reply envelope (with pre-paid postage). All participants who did not return a completed survey or who did not opt out of participating in the survey after five weeks were mailed another survey packet consisting of a different cover letter, another copy of the survey, and a business reply envelope, completing the second wave of mailing.

Using NEP to Understand Environmental Worldviews

To assess environmental worldviews there are a variety of available measures that have been used in the literature in surveying. These include the New Environmental Paradigm (NEP), Environmental Concern (EC), Roper Scale, Awareness of Consequences (AC), and Forest Values (FV) scale. In this survey the New Environmental Paradigm surveying technique was used, which has been interpreted as a measure of proenvironmental orientation and become a widely applied measure in the field (Dunlap, 2000). The progenitors of this rating system argue that this measure is an ambiguous rating that assesses environmental attitudes, beliefs and to some degree, values (Dunlap, 2000). The NEP survey components reveal primitive beliefs surrounding the environment (Dunlap, 2000), with Dunlap (2000) arguing that political scientists find NEP survey able to reveal “comprehensive environmental belief systems (Dalton, Gontmacher, Lovrich, and Pierce, 1999; Pierce, Lovrich, Tsurutani, and Takematsu, 1987). Dalton et al. (1999)

argue that this NEP worldview influences attitudes and beliefs on environmental issues. Essentially, high scores on the NEP scale lead to proenvironmental beliefs and attitudes on many issues (Pierce, Dalton, and Zaitsev, 1999; Stern, Dietz, and Guagnano, 1995). Because the NEP has been so widely applied and used by political scientists and others, as the most widely applied way of measuring a proenvironmental worldview or orientation, it offered the best measure for this study. This allows for comparison of this study to a multitude of other studies and provides well-supported measure of environmental worldview, one that is respected and has support in the literature.

Childhood v Adulthood: Outdoor Recreation and Environmental Values

The part of Richard Louv's (2005) hypothesis, that states youth exposure to nature at young ages results in stronger environmental worldviews later in life is testable. In this study, outdoor recreation participation is used as a method for measuring contact with nature and childhood involvement in outdoor recreation is the explicit focus. Outdoor recreation is a form of the unstructured interaction with nature and specific types of outdoor recreation are examples of the kind of activity that Wells and Lekies (2006) argue are related to stronger environmental worldviews. Kellert (1985) suggests that actual participation in experiential learning about animals through hunting, bird watching, or participating in animal related clubs produced more appreciation, more knowledge and more concern for animals in youth as compared to solely learning about animals in school or at the zoo. This is another good reason to investigate the result of childhood participation in outdoor recreation. Thus this study isolates and determines whether or not

outdoor recreation and experiences as children do influence environmental worldviews and outdoor recreation participation in adults. Wells and Lekies (2006) note that a large missing link in environmental education literature is how effective this education is over the long term, also an issue in the literature on the effects of outdoor recreation. For this reason and because Louv's hypothesis focuses on early childhood nature exposure, this study investigates participation in outdoor recreation during childhood before age 12 and then adulthood participation. Does participation in outdoor recreation as a young child have an impact on environmental worldviews?

While Ewert, Place and Sibthorp (2005) found that participation in appreciative outdoor activities, consumptive outdoor activities, and media exposure and as youth predicted more eco-centric beliefs, this research was only performed upon undergraduate students, a limited dataset. This survey extends a wider net and asks for a wider range of responses. The sample was a randomized sample from Oregon residents, developed with the goal of ensuring a wide range of study participants from a diversity of places and backgrounds. Additionally, most studies regarding environmental worldviews tend to focus on urban populations. For example Wells and Lekies (2006) seminal study regarding youth exposure to wild nature focused only on urban individuals. In addition, Wells and Lekies (2006) lament that much research on significant life experiences with nature focuses only on people involved in environmental careers or activism. Thus the randomized sample of 2000 metro and 2000 non-metro addresses used in this study, fixes both the urban focus of most studies as well as the activist problem by polling a random sample of individuals in Oregon. An additional question asking for the degree that

individuals' occupations involve the outdoors provides an even better sense of respondents' full outdoor experience.

Getting at Outdoor Recreation

To best analyze outdoor recreation, an extensive list of outdoor recreation activities from the 2008-2012 Oregon Statewide Comprehensive Outdoor Recreation Plan developed by the Oregon Parks and Recreation Department was produced (Oregon Parks and Recreation Department, 2008). This list consisted of 31 different outdoor recreation activities, which made up the most popular activities in Oregon. Adding an "other" category served to capture participation in unlisted activities. This list adds significantly to the literature, as most surveys investigating outdoor recreation and environmental worldviews have only surveyed for a limited number of activities (eg. Thapa, 2010- 21 surveyed activities, Wells and Lekies, 2006- 9, Tarrant and Green, 1999- 7, Theodori et al, 1998- 9). Thus this long list captures a greater diversity of outdoor recreation activities and offers a better representation of participants.

Jackson (1986) surveyed for a large range of activities (36 total) but then proceeded to only use 15 activities in analysis and coded the respondents into participants or non-participants. Similarly Tarrant and Green (1999), classified participants in these same categories by asking whether participants had participated in a recreation activity in a dichotomous yes or no format. These techniques do not assess intensity, thus respondents cannot be separated meaningfully. In these studies there is no distinction between an individual who kayaks once a year and an individual who kayaks 30 times in

a year, surely there is a difference between these recreationists. Thapa and Graefe (2003) and Bustam et al. (2003) investigate how outdoor recreation and environmental worldviews are connected and asked survey respondents to select their “most important activity,” using these answers to identify whether the respondents were classified as appreciative, consumptive or motorized recreationists. Using this technique fails to account for how much individuals are participating in the different types of activities. While one activity is listed as the most important there may be a second activity that is nearly as important to an individual and by measuring the amount of times that an individual participates in a diversity of activities offers a better representation of that individual and the importance of certain activities to that individual. This study does just that. Peterson et al. (2008) did survey for frequency of participation during an average year but only surveyed for participation in 7 activities, this was a step in the right direction but does not fully capture frequency. The literature struggles to build in frequency of participation in order to measure the intensity with which worldviews are held and nature experiences matter to particular individuals (e.g., Tarrant and Cordell 1997).

The aforementioned methods do not reveal real intensity of participation or how many times a participant is actually participating in a certain activity. This research seeks to rectify this situation by surveying for average participation in an a wide variety of activities each year, a more nuanced approach to classifying what type of outdoor recreation participant is responding. I ask for an average estimation of how much an individual participates in an outdoor activity- not at all, 1-2 times/year, 3-5 times/year, 6-10 times/year, 11-20 times/year, and more than 20 times per year. Determining whether

the participant is participating in solely appreciative activities or otherwise is crucial for determining if real connections exist between appreciative outdoor recreation and environmental worldviews. With this design it is possible to investigate the type of outdoor recreation participant the study subjects were as children and are as adults.

Place of Residence: Measuring Urban and Rural (and Places In-Between)

Most studies focus only on urban populations despite an established literature showing differences in environmental values between rural and urban residents (Clucas et al., 2011). For example Wells and Lekies' study (2006) which suggested that children participating in wild nature activities before age eleven were more likely to hold stronger environmental values as adults. The survey population, however, consisted of only urban children, a bias often observed due to easier data collection. Even when the urban-rural worlds are investigated the tendency is to treat them in dichotomous, either-or fashion (e.g., Cordell, Green, and Betz 2002) and to take the current place of residency as definitive.

To deal with this issue the survey population consisted of a randomized sample of 2000 metro and 2000 non-metro addresses to capture a large cross section of places of residence. Then individuals were asked four questions;

- a) What size of place did your parents live in when you were born?
- b) What size of place do you currently live in?
- c) What size of place did you live in for the majority of the time before age 18?
- d) What size of place have you lived in for the majority of the time since age 18?

To divide up size of place six categories were created: farm/ranch, rural area but not farm, town of less than 10,000 people, town of 10,000-100,000 people, town of 100,000-250,000 people, and town of more than 250,000 people.

Most importantly, nearly all studies investigating rural and urban differences use current place of residence as definitive. Essentially, if someone lives in a rural area currently then they are classified as a rural resident in the study parameters. In contrast this study asks what size of place people grew up for the *majority* of their childhoods and where they have lived for the majority of their adult lives in addition to where they were born and where they currently live. This develops a full portrait of where someone has lived in terms of size of place.

Basic Survey Statistics

To begin the data collection, 4000 surveys were sent out on July 25th and received 1022 returned surveys and 406 bad addresses. The 4000 surveys were sent out to randomized addresses split, with 2000 metro addresses and 2000 non-metro addresses. The second wave of 2723 surveys was sent on September 7th, 2013 to all the non-responders from the first wave, excluding the bad addresses. Ultimately 291 more usable surveys were returned to give us a total of 1313, fully usable and valid, returned surveys. This was the final survey population from which I started analyzing results.

From the entire sample there were 406 bad addresses and 1313 usable returned surveys, meaning our response rate was 36.53%. Of these respondents 36.4% were female and 62.3% male. The average age of survey respondents was 64.18, with a range

of 18 to 95 years old. When split into quartiles, the cut point for the 25th quartile was 57 years old, the 50th quartile is 65 years old, and for the 75th quartile is 73 years old. Our sample came from a wide variety of education levels. 18.5% of the sample had completed graduate school, a rate much higher than the national average. A larger percentage, 26.1% had graduated from college, while 31.2% had completed some college. Another 5.8% of our survey population completed vocational school. Lastly, 14.2% completed college while only 1.0% and 0.3% had only completed junior high school and grade school, respectively.

The majority of survey respondents were retired individuals, making up 56.1% of respondents; the second most common work situation was full time employment with 29.5% of respondents selecting this response. Following these two categories, 6.0% of survey respondents were employed part time. The next most common answers for work situation were “other”, not employed outside the home, unemployed, and “student” with respondent percentages of 3.1%, 1.8%, 1.7%, and 0.7%, respectively. When responding to whether there was an association between survey participants work/professional life and outdoor recreation activities, 46.3% said there was little to no association (less than 10%), 14.2% said there was some association (10-25%), 11.0% said there was a significant association (25-50%), 5.8% said there was an association for the majority of the time (50%+), while 7.8% said the association was nearly all the time (75%+). Lastly our survey population had only 3.2% of respondents making a household income of less than \$10,000, 16.2% making \$10,000-\$30,000, 21.6% making \$30,000-\$50,000, 33.8% making \$50,000-\$100,000, 13.1% making \$100,000-\$250,000, and 0.9% making \$250,000+ each year.

Results and Analysis

Measuring Environmental Worldviews

One of the key aspects of this research project lies in the way we assessed environmental worldviews. I used the New Environmental Paradigm (originally developed by Dunlap and Van Liere 1978) survey questions popularized by Pierce, Steger, Steel, & Lovrich (1992) to determine individuals' environmental worldviews. The survey consisted of six separate questions scored on a 1-5 Likert scale, ranging from strongly-disagree (1) to strongly-agree (5). More specifically, the prompts were:

- Q5a - The balance of nature is very delicate and easily upset by human activities
- Q5b - Humans have the right to modify the natural environment to suit their needs
- Q5c - We are approaching the limit of people the earth can support
- Q5d - The so called “ecological crisis” facing humankind has been greatly exaggerated
- Q5e - Plants and animals have as much right as humans to exist
- Q5f - Humans were meant to rule over the rest of nature.

Questions b, d, and f were reverse coded after inputting data to keep the scale logical and to generate an overall score, with higher scores indicating stronger endorsement of the new environmental paradigm, essentially a stronger environmental worldview. Table 4 describes the overall mean response to each question. The mean NEP score for survey participants was 20.99, with a range from 6 to 30, the highest and

lowest possible scores on our scale. Table 5 describes descriptive statistics of the survey population in terms of their NEP Worldview score.

Table 4. Individual NEP question statistics

	Mean	Std. Deviation	N
Q5a	3.8245	1.25932	1282
Q5b	3.4836	1.27124	1282
Q5c	3.3471	1.3465	1282
Q5d	3.17	1.45902	1282
Q5e	3.8666	1.34408	1282
Q5f	3.3019	1.49006	1282

Table 5. NEP Worldview Scores

N	Range	Minimum	Maximum	Mean	Std. Error	Std. Deviation	Variance
1282	24	6	30	20.9938	0.16183	5.79442	33.575

The overall statistics for New Environmental Paradigm worldview scores for Oregon adults suggests moderate acceptance of the NEP worldview. The mean score of 20.99 suggests that the survey population on average accepts rather than rejects the NEP (we would expect a score of 18 if there was neither acceptance or rejection of the NEP). Additionally the standard error of 0.162, indicates 95% confidence that in the sample of Oregon residents, that the average NEP score is captured in the range between 20.83 and 21.15, again indicating moderate acceptance of NEP worldviews.

In order to use the scale in data analysis a reliability analysis was necessary to make sure the scale had strong internal consistency.

Table 6a. Reliability Analysis of NEP Scale: Inter-Item Correlation Matrix

	Q5a Recoded	Q5b Reverse Coded	Q5c Recoded	Q5d Reverse Coded	Q5e Recoded	Q5f Reverse Coded
Q5a Recoded	1	0.407	0.455	0.476	0.467	0.371
Q5b Reverse Coded	0.407	1	0.31	0.331	0.431	0.406
Q5c Recoded	0.455	0.31	1	0.422	0.376	0.369
Q5d Reverse Coded	0.476	0.331	0.422	1	0.334	0.44
Q5e Recoded	0.467	0.431	0.376	0.334	1	0.45

Q5f Reverse Coded	0.371	0.406	0.369	0.44	0.45	1
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Table 6b. Reliability Analysis of NEP Scale: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.801	0.802	6

The reliability analysis of the NEP Scale suggests a good deal of internal validity with a Cronbach's alpha score of 0.801. This number indicates that the answers given by respondents were reliable with a great degree of internal consistency.

Measuring Outdoor Recreation Participation: Two Different Methods

As discussed above, the traditional method of measuring outdoor recreation activity levels is not satisfactory because it employ simple methodologies. Specifically, typical measurement uses dichotomous “yes or no” scales that, by definition, make no distinction between individuals who recreate once and those who spend significant time engaged in recreational activities (see Jackson 1986; Tarrant and Green 1999). Additionally the studies using more comprehensive intensity scoring, fail to operationalize the variables in a satisfactory manner. Therefore, a more robust measure of recreational activities that focuses on the frequency, or intensity of an individual's participation in various outdoor recreation activities was used in this study. Toward this goal, respondents were offered a range of options indicating the frequency, or number of times, they participated in each of the 32 selected activities on an annual basis as a child (under age 12). This produces a measure of participation “intensity.” To produce these intensity scores, survey respondents were given a series of choices ranging from “zero” all the way up to 20+ days per year. What this “intensity” score means is the total number

of times that an activity or a type of activity was participated in. Beyond simply developing a more accurate measure of outdoor recreation activity levels, the different measurement methods allow testing of the Louv hypothesis regarding the expected positive relationship between outdoor recreation and the strength of an individual's environmental worldviews as an adult in two different ways. If, as expected, the new, more robust measure of outdoor recreation intensity changes the levels of outdoor activity in significant ways, will that also change the results of our analysis when the Louv hypothesis is tested?

Childhood and Adulthood Outdoor Recreation Participation: Traditional Measurement Method

Table 7 shows the overall frequency of participation in selected outdoor recreation activities during individuals' childhoods, prior to the age of 12. This measures all individuals who participated in each activity at least one time on average per year. This is the traditional way outdoor recreation participation is measured. To see a full breakdown of each separate activity, see Table 1A in the Results Appendix.

Table 7. Most Popular Childhood Activities

Activities (Over 50% Participation)	Overall Percent Participation Childhood
Swimming or playing in lakes, rivers, ocean	84.3%, n=1098
Playing in the woods/forest	76.3%, n=996
Fishing (spinners/hardware and/or bait)	75%, n=978
Hiking	69.3%, n=904
Tent camping	66.5%, n=868
Sledding (snow)	61.8%, n=805
Collecting (rocks, plants, mushrooms, berries, etc.)	59.2%, n=773

Some notable frequencies were observed in this dataset. The most common childhood outdoor recreation activity was swimming or playing in lakes, rivers, ocean, followed by playing in the woods and fishing (spinners/hardware and/or bait), with 84.3%, 76.3%, and 75.0% of the survey population participating in each, respectively. The next most popular group of activities were hiking, tent camping, sledding (snow), and collecting (rocks, plants, mushrooms, berries, etc.) with 69.3%, 66.5%, 61.85%, and 59.2%, respectively, of the survey population participating. A third group of activities stands out with nearly over 40% participation, including, motorboating, bird or wildlife watching, and hunting (guns), with participation percentages of 45.8%, 44.8%, and 39.6% respectively. On the other end of the spectrum were activities like motorized parasailing or gliding, parasailing or hang-gliding, and Windsurfing, with very few participants, 0.4%, 0.5%, and 0.6% of the survey population respectively. Surfing was the fourth least popular activity with only 4.5% of the survey population participating.

Adult Outdoor Activity Participation

As adults, survey respondents unsurprisingly displayed many similar outdoor recreation choices. Swimming or playing in lakes, rivers, ocean and playing in the woods/forest, the most popular childhood activities, were replaced by tent camping as the most commonly participated in activity for adults with 78.5% of respondents participating at least once a year. Respondents still swam and played in the woods at high levels, with 76.9% and 72.3% respondents participating in each, respectively. Table 8 shows the most popular activities for adult survey respondents, based on simple

participation (the percent of the survey population who participated at least once in an activity).

Table 8. Most Popular Adulthood Activities

Activities (Over 49% Participation)	Overall Percent Participation Adult
Tent camping	78.5%, n=1026
Swimming or playing in lakes, rivers, ocean	76.9%, n=1007
Playing in the woods/forest	72.3%, n=947
Fishing (spinners/hardware and/or bait)	69.5%, n=908
Bird or wildlife watching	59.9%, n=785
Collecting (rocks, plants, mushrooms, berries, etc.)	58.7%, n=769
Outdoor scenic photography	54.9%, n=719
RV/tow-behind trailer camping	49.4%, n=646
Motorboating	49.1%, n=642

The next most popular activities for adults overall in terms of participation were fishing (spinners/hardware and/or bait), bird or wildlife watching, collecting (rocks, plants, mushrooms, berries, etc.), outdoor scenic photography, RV/tow-behind trailer camping, and motorboating. Overall there were more people in the survey population participating in outdoor recreation activities as adults, across all categories. The activities with the highest levels of participation remained relatively similar, however many activities with 0-20% participation rates during childhood (like surfing, parasailing, rock climbing), showed higher participation rates during adulthood- (See Tables 1A and 2A in Results Appendix for each activity breakdown). This makes sense as many people in the survey population were older and some of the more uncommon activities like rock climbing, windsurfing simply were not readily available and/or some activities did not exist when respondents were children.

Again, the number of people participating at higher intensities decreased as the intensity of participation increased, with many activities showing subsequent spikes in

the most intense category (20 + times avg/yr). (See Results Appendix Table 2A). This could be a survey bias in simply selecting the highest category of participation because individuals remember doing an activity regularly but not the exact amount of times they did the activity each year.

Outdoor Recreation Activity “Intensity” Compared to Traditional Measurement Methods

The selected activities in Tables 9 and 10 represent those outdoor recreation items with the top ten highest levels of participation intensity during childhood and those same activities during adulthood. Outdoor recreation intensity is scored using a scale of five possible responses, all predicated on an annual basis: zero, 1 to 2 times, 3 to 5 times, 6 to 10 times, 11 to 20 times, and 20+ times (per year). These choices were then translated to “total number of times” per person using their midpoint values. For example, a respondent checking the 1 to 2 box received an intensity score of 1.5, while someone checking the 6 to 10 box was scored at an 8. For the 20+ times case, an intensity score of 22 was used providing a very conservative estimate of the average times per year participation, although a number of these respondents likely are participating at levels in the 30 to 50 times range per year. Tables 6 and 7 also report the total intensity scores for the selected set of activities or the *total number of times that an activity was participated* in each year and *average intensity scores- the number of times each individual who participates in a particular activity engages in that activity over the course of a year.* (For a full table breaking down each activity see Results Appendix Tables 3A and 4A.)

The new, more accurate measure of outdoor recreation levels provide participation scores that are dramatically different and substantially higher, in most cases an order of magnitude higher, when compared to the traditional dichotomous method of measuring outdoor recreation activities. In fact, the average overall percent differences between the traditional measurement method and the intensity measure *for all outdoor recreation choices* is 948.8% for childhood activity and 891.2% for adulthood activity.

Table 9. Childhood Outdoor Recreation Intensity Compared to Traditional Measurement Method

Outdoor Recreation Activities	Childhood Total Intensity or Activity Score (Times activity was participated in by all respondents)	Total Number of Participants in Activity	Average Level of Participation (Times per year for participants)	Percentage Difference Compared to Standard Measure
Swimming or playing in lakes, rivers, ocean	14042.5	1098	12.79	1279%
Playing in the woods/forest	12594.5	996	12.645	1265%
Fishing (spinners/hardware and/or bait)	10396.5	978	10.630	1063%
Hiking	8064.5	904	8.921	892%
Collecting (rocks, plants, mushrooms, berries)	7199	773	9.313	931%
Sledding (snow)	7159	805	8.893	889%
Tent camping	6679	868	7.695	770%
Hunting (gun)	5447.5	517	10.537	1054%
Bird or wildlife watching	5220	584	8.938	894%
Motorboating	5076	598	8.488	849%
Other	2393	1123	13.14835165	1300.1%

Children under the age of 12 participated most intensely in swimming or playing in lakes, rivers and the ocean, playing in the woods/forest and fishing with spinners/hardware/or bait. Each of these activities garnered over 10,000 participation events, combining all respondents. These three activities also had the highest average levels of participation along with the “other” category. Each averaged over 10 times of participation for the

average participant. Taken together, these results mean that these activities were experiencing high levels of participation by most of the survey population. In contrast, while hunting was the 8th most participated in activity in the overall sense, the average participation was 5th, and nearly 4th. Thus, fewer individuals participated in hunting but those who participated, participated a lot.

Table 10. Adulthood Outdoor Recreation Intensity Compared to Traditional Measurement Method

Outdoor Recreation Activities	Total Intensity or Activity Score (Times activity was Participated in by all respondents)	Total Number of Participants in Activity	Average Level of Participation (Times per Year for Participants)	Percentage Difference Compared to Standard Measure
Swimming or playing in lakes, rivers, ocean	9806.5	302	9.738	973.8%
Playing in the woods/forest	10371	362	10.951	1095.1%
Fishing (spinners/hardware and/or bait)	10057	399	11.076	1107.6%
Hiking*	N/A	N/A	N/A	N/A
Collecting (rocks, plants, mushrooms, berries)	7131	542	9.273	927.3%
Sledding (snow)	2335	904	5.737	573.7%
Tent camping	8220.5	281	8.012	801.2%
Hunting (gun)	6162.5	1153	11.806	1180.6%
Bird or wildlife watching	8241.5	523	10.499	1049.9%
Motorboating	5877.5	665	9.155	915.5%
Other	2838.5	1094	13.08	1308.1%

*Due to an OSU printing and mailing error Hiking was omitted from adulthood outdoor recreation choices

Adulthood intensity scores for activities are a more robust measure with significant differences from traditional measures. Overall, individuals participated less in outdoor recreation participation as adults. Activities showed both decreases and increases in intensity of participation. Hunting increased in intensity of participation, a sensible result as adults are much more likely to be able to handle guns and participate in an activity like

hunting. Tent camping and bird or wildlife watching showed marked increases of 1541.5 and 3021.5 times participated in by the survey population. Both swimming and sledding had far lower participation rates for adults.

Testing the Louv Hypothesis: Youth Exposure to Nature and Environmental Worldviews

Now that a good understanding of respondents' preferences for and intensity of participation in outdoor recreation activities is established the first basic research question can be analyzed. Does exposure to nature through outdoor recreation activities as a child correspond with more pro-environmental worldviews as an adult? This analysis tests the generally accepted hypothesis developed by Richard Louv in *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder* (2008), namely that more unstructured contact with nature as a child results in stronger environmental worldviews. In this study participation in outdoor recreation activities is used as a proxy for nature contact. The first cut at this uses a traditional method of measuring outdoor recreation participation.

The second test of the data, however, employs the new method for measuring outdoor recreation activity by focusing on the frequency or intensity, with which each child up to the age of 12 participates in an activity each year. The "intensity" measure developed for outdoor activities in this study is a more robust measure for the overall relationship between environmental worldviews and outdoor recreation choices than current methodologies because it more fully captures the total number of times a child engages in outdoor recreation activity each year.

The analysis is then extended to explore whether it matters which types, or categories, of outdoor activities a child participates in. Drawing from the literature on different types of recreational activities, a positive relationship is expected between children who primarily contact nature through appreciative outdoor recreation activities and environmental worldviews, while the reverse relationship is expected between motorized and consumptive activities and environmental worldviews.

Finally, the analysis is taken beyond the Louv hypothesis by testing to see if there is a relationship between outdoor recreation activity types for *adults* and their environmental worldviews.

Participation in Outdoor Recreation and Environmental Worldviews: The Louv Hypothesis as Viewed through the Lens of Traditional Measurement Methods

To answer this question the New Environmental Paradigm scores and the outdoor recreation data assessed in the survey are integrated. Most analysis on outdoor recreation participation and connection to environmental worldviews fails to build intensity into the measures as discussed in the methods earlier. Testing the Louv hypothesis with standard research methods, means solely basing analysis on participation in specific outdoor recreation activities or lack of participation in outdoor recreation activities. Thus the number of outdoor recreation activities that each individual participated in during childhood was calculated, resulting in a score between 0 and 32. The relationship between this score and NEP environmental worldviews is displayed in Table 11 below.

Table 11. Correlation between NEP (New Environmental Paradigm) worldview score and Traditional Childhood Outdoor Recreation Participation

		Number of Childhood Activities Participated in
NEP Environmental Worldview Score	Pearson Correlation	-.037
	Sig. (2-tailed)	.190
	N	1274

Every correlation done in this analysis was done on a pairwise-exclusion basis. Essentially, for this test above, every individual's NEP environmental worldview score was compared to the number of childhood activities that individual participated in, and the overall correlation seen in table 11 is all of these correlations averaged, for the survey population. We used this pairwise methodology with all of the correlations in this study. The correlation between NEP environmental worldview score and the number of outdoor recreation activities participated in on average during childhood was -0.037 with no statistical significance. Thus, the number of outdoor recreation activities that children participated in before age 12 is not related to later environmental worldviews. Based on typical measures of outdoor recreation, the Louv hypothesis has little support; there appears to be little relationship between the number of outdoor recreation activities that an individual participates in and their environmental worldviews.

Outdoor Recreation Intensity and NEP Environmental Worldviews

Using the number of activities that individuals participate in to assess what type and how much contact individuals have with nature is a limited measure. This is why the comprehensive measure assessing intensity of participation in outdoor recreation activities was developed, to fully analyze how much and what type of outdoor recreation

individuals are participating in. The more developed measure offers a clearer snapshot of individual survey respondents and the types of outdoor recreation activities that they were participating in as a child and the types of activities that they were participating in most frequently.

The six response categories were scaled as discussed previously in the results. From these scaled scores an estimated total childhood outdoor recreation intensity score was calculated, the *combined total number of times* that an individual participated in all activities. This new measure was compared again to NEP environmental worldview scores in Table 12 below.

Table 12. Correlation between New Environmental Paradigm (NEP) Worldview Score and Childhood Outdoor Recreation Intensity

		Childhood Outdoor Recreation Intensity
NEP Environmental Worldview Score	Pearson Correlation	-.024
	Sig. (2-tailed)	.388
	N	1274

Childhood outdoor recreation intensity was correlated to NEP environmental worldview scores at an extremely weak -0.024 relationship, with **no statistical significance**. The relationship only had significance to 0.388, much too high for a statistically significant relationship. Even with a more inclusive measure for overall participation in outdoor recreation before the age of 12, there appears to be little relationship between that participation and stronger or weaker environmental worldviews as an adult. Taken together, participation in outdoor recreation activities as a youth does not appear to correspond to stronger environmental worldviews, providing evidence contrary to the Louv hypothesis.

Testing “Louv” Using Three Types of Outdoor Recreation Activity

Does it matter what type of outdoor activities a child participates in? Might arranging the outdoor recreation data along recreation type show support for the Louv hypothesis? Using the established literature in this area, the list of surveyed activities was split into three separate groups—appreciative, motorized and consumptive—in order to run a third and fourth test of the Louv hypothesis. (See Table 13.) The analysis examines this relationship using the traditional measurement method for outdoor activities before turning to an analysis using the new, more robust method of measurement.

Table 13. Types of Outdoor Recreation Activity

Appreciative (Dunlap & Heffernan, 1975; Hende, 1969)	Motorized (Jackson 1986, 1987)	Consumptive (Dunlap & Heffernan, 1975; Hende, 1969)
Tent camping, RV/tow-behind trailer camping, hiking, bird or wildlife watching, river rafting or kayaking, canoeing, swimming or playing in lakes, rivers, ocean, backpacking, playing in the woods/forest, cross-country skiing, downhill skiing/snowboarding/telemarking, snowshoeing, windsurfing, surfing, parasailing or hang-gliding, trailrunning, mountain biking, road cycling, outdoor scenic photography, rock climbing, and sledding	Off-road vehicle travel (ATV’s; 4-wheel drive vehicles; dune buggies; motorcycles/motocross; etc.), motorboating, waterskiing, motorized parasailing or gliding, and snowmobiling	Fishing (spinners/hardware and/or bait), fly-fishing, hunting (guns), hunting (bow), and collecting (rocks, plants, mushrooms, berries, etc.).

The analysis first determined how many of an individual’s childhood outdoor recreation activities were associated with each of the appreciative, motorized, and consumptive categories. Using the traditional dichotomous method of measurement, the total number of activities participated in by an individual in each category were added together to develop the proportionality of a person’s outdoor activities allocated to either

appreciative, motorized or consumptive. For example, if a respondent in a given year participated in ten different recreational activities and three were “appreciative,” two were “motorized” and the remaining five were “consumptive,” the respondent would have proportional scores of 0.3 appreciative, 0.2 motorized, and 0.5 consumptive. Table 14 presents the summary data for these relationships.

Table 14. Relationships between Environmental Worldviews and Different Types of Childhood Outdoor Recreation Activities *based on Traditional Measurement Methods*

	Correlation to NEP Environmental Worldview Score	
Number of Appreciative Outdoor Recreation Activities Per Year during Childhood	Pearson Correlation Sig. (1-tailed)	0.008 0.388
Number of Motorized Outdoor Recreation Activities Per Year during Childhood	Pearson Correlation Sig. (1-tailed)	-.069** 0.007
Number of Consumptive Outdoor Recreation Activities Per Year during Childhood	Pearson Correlation Sig. (1-tailed)	-.098** 0
Proportion Appreciative Outdoor Recreation Activities Per Year during Childhood	Pearson Correlation Sig. (2-tailed)	.070** 0.006
Proportion Motorized Outdoor Recreation Activities Per Year during Childhood	Pearson Correlation Sig. (2-tailed)	-.077** 0.003
Proportion Consumptive Outdoor Recreation Activities Per Year during Childhood	Pearson Correlation Sig. (2-tailed)	-.069** 0.007
**. Correlation is significant at the 0.01 level (2-tailed). N=1274		

This data shows that there is a relationship, although extremely weak, between participation in different types of activities and environmental worldviews. There are negative correlations with significance to the 0.01 level between NEP environmental worldviews and the *number* of motorized and consumptive recreation activities. Yet, there is little to no relationship between the *number* of appreciative activities and environmental worldviews. Changing the analysis to observations of the activities an individual *proportionally* participates in makes little difference in the conclusions to be drawn from the data. Individuals participating in higher *proportions* of motorized or consumptive activities have similar, and negative, scores, while there is a positive correlation of 0.070 between the *proportion* appreciative outdoor recreation activities

participated in and environmental worldviews with significance to the 0.006 level. In sum, and once again, there is little evidence supporting the Louv hypothesis that general contact with nature produces stronger environmental values, although there is tenuous support for a slight positive relationship between appreciative activities and environmental worldviews for children participating in *proportionally* more appreciative type activities.

Does the method of measurement lead to different conclusions as regards the Louv hypothesis when it comes to appreciative, motorized and consumptive recreation activities? Table 15 uses childhood outdoor recreation intensity scores to retest the relationships between environmental worldviews and different types of childhood outdoor recreation activity. Once again, if an individual participated 60 times in consumptive outdoor recreation activities, 10 times in motorized outdoor recreation activities, and 30 times in consumptive outdoor recreation activities, they would score a 0.6 appreciative, 0.1 motorized, and 0.3 consumptive, proportion outdoor recreation intensity. Table 15 investigates the relationships between outdoor recreation type and childhood outdoor recreation intensity for individuals.

Table 15. Relationships between Environmental Worldviews and Different Types of Childhood Outdoor Recreation *Intensity Scores*

	Correlation to NEP Environmental Worldview Score	
Intensity of Appreciative Outdoor Recreation Activity (Times Per Year Childhood)	Pearson Correlation Sig. (2-tailed)	0.015 0.583
Intensity of Motorized Outdoor Recreation (Times Per Year Childhood)	Pearson Correlation Sig. (2-tailed)	-.067* 0.017
Intensity of Consumptive Outdoor Recreation (Times Per Year Childhood)	Pearson Correlation Sig. (2-tailed)	-.067* 0.017
Proportion Appreciative Outdoor Recreation Intensity (Times Per Year during Childhood)	Pearson Correlation Sig. (2-tailed)	0.068* 0.016
Proportion Motorized Outdoor Recreation Intensity (Times Per Year during Childhood)	Pearson Correlation Sig. (2-tailed)	-0.060* 0.033
	Pearson Correlation	-0.072*

Proportion Consumptive Outdoor Recreation Intensity (Times Per Year during Childhood)	Pearson Correlation Sig. (2-tailed)	-0.072* 0.01
** Correlation is significant at the 0.01 level (2-tailed)		
* Correlation is significant at the 0.05 level (2-tailed) N=1274		

Once again, we find little support for the Louv hypothesis. There is a very weak, positive correlation of 0.068 (statistically significant to the 0.016 level) between *proportion* appreciative outdoor recreation intensity during childhood and NEP environmental worldview scores. Correspondingly, statistically significant to the 0.05 level, very weak negative correlations of -0.060 and -0.072 exist between *proportion* motorized and *proportion* consumptive outdoor recreation intensity and NEP environmental worldview scores. This means that children who had more appreciative outdoor recreation experiences were more likely to have stronger environmental worldviews, albeit by just a little bit. Children who participated in higher *proportions* of motorized and consumptive outdoor recreation activities were more likely to have weaker environmental worldviews. While both of these relationships were weak, the large size of our survey population does lend some weight to the results.

A Modified Louv Hypothesis?

Overall these results indicate little support for the Louv hypothesis, but there is some support for a modified Louv hypothesis. Put differently, simply experiencing nature contact through outdoor recreation as a child (prior to the age of 12) does not predispose individuals to stronger environmental worldviews, nor does it do so in the opposite direction. However, *some relationships between environmental worldviews and outdoor recreation participation were uncovered when the activities were separated into appreciative, motorized, and consumptive categories*. Specifically, there was a very weak

positive correlation between the proportion of appreciative outdoor recreation activity, measured by both the number of activities participated in and by intensity (number of appreciative outdoor recreation experiences) and NEP environmental worldviews.

In addition, there is a weak negative relationship, between the number and proportion of motorized and consumptive outdoor recreation activities that children participated in and NEP environmental worldviews. Additionally, more robust measurements investigating proportion motorized and consumptive outdoor recreation *intensity* of participation found the same weak negative relationships with environmental worldviews. Importantly, these weak correlations are significant due to the size of our overall sample and suggest that the type of activities that children in our sample were participating in does have a slight impact on the environmental worldviews that they espouse later in life.

Moving Beyond the Louv Hypothesis: Testing Adult Recreation Levels and Environmental Worldviews

Even though Louv's hypothesis concerns only the relationship between childhood "nature contact" through outdoor recreation activities and environmental worldviews, we thought that the same relationship at the adult level might prove to be more robust, especially as concerns adult preferences for the different types of recreational categories. This is because Louv focuses on children who may be engaged in unstructured activities, but also are much more likely to be directed toward particular activities by parents, neighboring families, friends and relatives. Yet, adults are presumably in charge of their outdoor choices, so we hypothesized that perhaps adult participation patterns, especially

those with high intensity outdoor recreation levels, would reflect a stronger, or weaker connection, to environmental worldviews depending on whether they primarily preferred appreciative, motorized or consumptive types of activities. In particular we hypothesized that adults engaged in proportionally more appreciative outdoor activities would be most likely to hold strong environmental worldviews. Table 13 displays the relationships between the three categories of outdoor recreation and NEP environmental worldview scores.

Table 16. Relationship between Environmental Worldviews and *Adult Proportion Appreciative, Motorized, and Consumptive Recreation Intensity Scores*

		NEP Environmental Worldview Score
Proportion Appreciative Outdoor Recreation Intensity (Times Per Year during Adulthood)	Pearson Correlation	0.146^{**}
	Sig. (2-tailed)	0.000
Proportion Motorized Outdoor Recreation Intensity (Times Per Year during Adulthood)	Pearson Correlation	-0.103^{**}
	Sig. (2-tailed)	0.000
Proportion Consumptive Outdoor Recreation Intensity (Times Per Year during Adulthood)	Pearson Correlation	-0.130^{**}
	Sig. (2-tailed)	0.000
**. Correlation is significant at the 0.01 level (2-tailed). N=1259		

Both the proportion motorized and consumptive outdoor recreation intensity scores for adults are weakly and negatively correlated to NEP environmental worldview scores, showing correlations of -0.103 and -0.130 respectively with significance to 0.000. However, there is a weak correlation of 0.146 with significance to the 0.000 level between the appreciative outdoor intensity scores as an adult and NEP environmental worldview scores.

In an interesting note, the correlation between proportional participation in each type of outdoor recreation activity as an adult is greater than the same correlation calculated for childhood participation in appreciative outdoor recreation. Thus, *adults who participate in more appreciative outdoor recreation proportionally than motorized*

or consumptive outdoor recreation are more likely to hold stronger environmental worldviews.

Environmental Worldviews, Outdoor Recreation, and Place of Residence

A diversity of literature investigates the rural-urban divide and discusses how people living in different places often have different values. These differences in values extend to individuals' views towards environmental protection or their environmental worldviews. Brunson and Steel (1996) show that there are differences in the beliefs and values regarding rangeland management practices between rural residents and urban residents and that these differences are often a result of rangelands being economically critical to rural economies. Clucas, Henkels, & Steel (2011) offer one of the most comprehensive analyses of Oregon residents suggesting that urban and rural residents have different environmental worldviews, they suggest that urban residents tend to embrace the New Environmental Paradigm, or the NEP worldview while rural residents are less likely to embrace these views. We pursue and extend this line of research by asking whether individuals' environmental worldviews vary based on the size of place they live in, while also asking the same question with respect to their outdoor recreation activity choices.

In addition, we consider "place of residence" for each respondent as a child and currently as adults in order to develop a lifetime urban-rural measure. I developed the lifetime urban-rural measure as a way to refine the accuracy of the conventional method for determining whether an individual is classified as an "urban" or "rural" resident,

which is based on a respondent's current place of residence. The conventional measure assumes that a current snapshot is an adequate proxy for a person's "ruralness" or "urbanness." Yet, such a snapshot is unlikely to be correct in many, if not most cases given how people move around during their lives. Hence, the "lifetime" measure is used since individuals living in one place at the time of the survey is quite likely to have experienced a different size of place growing up.

Before reporting the results of the analyses here, it is important to understand the basic "place of residence" statistics associated with survey respondents.

Place of Residence Statistics

The survey instrument assessed size of place using a 1-5 Likert scale. On one end of the scale, with a score of one, were responses listing "Farm/Ranch" and "Rural area but not a farm." The response "Less than 10,000 people" was coded as a 2, "10,000-100,000 people" was coded as a 3, and "100,000-250,000 people" was coded as a 4. The highest score of five was assigned to responses indicating residence in a place with "More than 250,000 people." Respondents were asked to indicate their place of residence during their childhood and their adulthood using the following questions.

- During your childhood (age 18 or younger) what size of place did you live in for the majority of the time?
- Since the age of 18, what size of place have you lived in for the majority of the time?

The results show that the average size of place for “childhood” for our survey population of Oregon residents was 2.48, which translates into a midpoint between cities of less than 10,000 people and cities with 10,000 to 100,000 people. For the majority of adult life, survey respondents averaged, 2.80, which is much nearer to “cities of 10,000-100,000.” On average, then this suggests that as survey participants aged, they moved into larger places. Thus we can conclude that our survey population represents the previously noted trend of urbanization of the U.S. population. Table 17 below, displays a more in depth breakdown of childhood responses for size of place.

Table 17. Size of Place During the Majority of Childhood

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1.00	397	30.2	30.9	30.9
2.00	301	22.9	23.4	54.3
3.00	330	25.1	25.7	80.0
4.00	87	6.6	6.8	86.8
5.00	170	12.9	13.2	100.0
Total	1285	97.9	100.0	
Missing System	28	2.1		
Total	1313	100.0		

The most common place of residence for individuals as children was Farm/Ranches and in rural areas with 30.2% of respondents growing up in such places. The least common place of residence was in cities of 100,000-250,000 with only 6.60% of survey respondents growing up in cities of that size. Perhaps this makes sense in an Oregon survey. There are few cities in that size range, Portland dominates as a large city, but especially with our older survey population, the size of cities such as Salem and Eugene, which currently fit the size definition of 100,000-250,000 residents, were far less populous 40 years ago or 60 years ago when the majority of our survey participants were

children. Table 18 below describes the same characteristics but for where people lived their adult lives.

Table 18. Size of Place During the Majority of Adult Life

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1.00	281	21.4	21.8	21.8
2.00	227	17.3	17.6	39.4
3.00	453	34.5	35.1	74.5
4.00	121	9.2	9.4	83.9
5.00	208	15.8	16.1	100.0
Total	1290	98.2	100.0	
Missing System	23	1.8		
Total	1313	100.0		

As adults, individuals from our survey population were most likely to live in cities of 10,000-100,000 individuals, with 35.1% of survey respondents living in cities this large. On the other end individuals from our survey population were least likely to live in cities sized 100,000-250,000, only 9.40% of survey respondents lived in cities this large. Table 18 helps document a shift in where individuals in our survey sample lived over their lives. Fewer people lived in rural areas and on farms and ranches for the majority of their lives, with only 21.8% of respondents living in these areas for the majority of their lives compared to 30.9% spending their childhoods there. The largest percent change from childhood size of place to adult size of place was in the 10,000-100,000 size category, 35.1% of survey participants lived in cities this size for the majority of their lives while 25.7% lived there during their childhoods. This is consistent with Monkkonen's (1988) argument that midsized cities were experiencing the greatest growth during the last 40-60 years.

Exploring Environmental Values and Size of Place using Conventional Methods

As previously noted, the conventional method for determining whether an individual is classified as “urban” or “rural” is based on a respondent’s current place of residence. In order to simplify analysis, the two top scores (score of 4 or 5) on the 5-point Likert scale to signify urban were combined, as were the scores of 1 or 2 to identify rural residents. Scores of three—places with populations between 10,000 and 100,000—were labeled “middle.” Breaking it down in this way showed that the survey sample had 664 rural respondents, 431 “middle” residents, and 167 urbanites. Table 19 displays the relationships between size of place and NEP environmental worldview scores using the conventional method of measurement.

Table 19. Current Size of Place, Mean NEP Worldview Score

	N	Mean	Std. Deviation	T-Test for Difference With Urban NEP Mean
Rural (1 or 2)	664	20.819	6.06927	P= 0.019, DF=280
Middle (3)	431	20.821	5.49572	P= 0.023, DF=306
Urban (4 or 5)	167	21.952	5.40505	-

The results show that the rural and middle NEP environmental worldview scores are almost exactly the same at 20.819 and 20.821, respectively. The urban residents, on the other hand, report stronger environmental values at 21.952. Two sample t-tests find that the differences between the average NEP scores for middle and rural residents are both statistically different from urban residents. Overall, this provides some evidence to suggest that urban and rural environmental worldviews are different in Oregon.

Refining the Conventional Measure to Get a Lifetime Measure of Residence

Unfortunately, categorizing residents by *current place of residence* may mischaracterize an individual who spent their entire lifetime in a rural area but recently moved. The same can be said for urban residents who recently moved to a rural place. With increasing mobility, people are far less likely to stay in one area for their entire lives than they were one hundred years ago. With these constraints in mind, an improved way to measure the degree of an individual's "urbanness" or "ruralness" is by using a series of questions that reveal an individual's "size of place" across a lifetime. Using the same 5-point rural to urban scale, the survey develops a lifetime picture of where individuals lived, asking, "during your childhood (age 18 or younger) what size of place did you live in for the majority of the time?" and, "since the age of 18, what size of place have you lived in for the majority of the time?" Combining these two questions produced a urbanness/ruralness score across an individuals' lifetime, from childhood to adulthood. A quick glance at Table 20 reveals the large numerical discrepancies between current size of place and where individuals lived for the majority of their lives, both childhood and adulthood.

Table 20. Size of Place, Comparing Results from Conventional and Lifetime Measures

	Size of Place Answer					
	(Most Rural)				(Most Urban)	
	1	2	3	4	5	Total
Current Size of Place	406	273	443	52	116	1290
Size of Place for Majority of Adulthood	281	227	453	121	208	1290
Size of Place for Majority of Childhood	397	301	330	87	170	1285

Finding the average childhood and adult size of place for each individual helped create a lifetime place of residence score. Next, size of place lived during the majority of childhood, adulthood and the total lifetime size of place score was correlated to

individuals NEP environmental worldview scores. The results from these correlations are displayed in Table 21 below.

Table 21. Environmental Worldviews and Size of Place Relationships

		NEP Environmental Worldview Score
Childhood Size of Place	Pearson Correlation	.057*
	Sig. (2-tailed)	.045
	N	1257
Adulthood Size of Place	Pearson Correlation	.082**
	Sig. (2-tailed)	.003
	N	1263
Lifetime Size of Place	Pearson Correlation	.083**
	Sig. (2-tailed)	.003
	N	1256
*. Correlation is significant at the 0.05 level (2-tailed).		
**. Correlation is significant at the 0.01 level (2-tailed).		

There are very weak relationships between the sizes of place that survey respondents lived in for the majority of their childhood, adulthood and overall lifetime and NEP environmental worldview scores. Childhood size of place had the weakest relationship with environmental worldviews, correlated by 0.057 with significance to the 0.045 level. Thus, children from this survey population who grew up in larger places are more likely to have stronger environmental worldviews, although only very slightly. There is a very weak relationship between the size of place lived in for the majority of adult life and NEP environmental worldview scores of 0.082, significant at the 0.01 level. This relationship is stronger than the relationship between environmental worldviews and size of place as a youth. Each is essentially indicating that there is a slight relationship between larger sizes of place and stronger environmental worldviews; however, this relationship is not strong in either case. Lastly, we observed the strongest relationship with overall lifetime size of place scores having a positive correlation of 0.083 with significance to 0.003. Individuals that lived in more populated urban areas tended to have stronger environmental worldviews.

Table 22 displays a lifetime categorization with different degrees and classifications of urbanness and ruralness. Individuals who grew up in rural areas and lived in rural areas for the majority of their adult lives are categorized as the strongest rural (1 or 2 to 1 or 2 category), with people who grew up in cities over 100,000 people and lived in cities of the same size for the majority of their adult lives (4 or 5 to 4 or 5 category) categorized as the strongest urban residents. Table 13 displays the intermediate categorizations as well, indicating which categories of size of place were grouped together.

Table 22. Lifetime Categorization of Degree of Urbanness and Ruralness

	Childhood Size of Place and Adult Size of Place	Average NEP Environmental Worldview Score
Group A (Using t-tests)		
Strongest Rural	(1 or 2) to (1 or 2)	20.0265 N=378
Middle	3 to 3	19.7283 N=184
Group B (Using t-tests)		
Strongest Urban	(5 or 4) to (5 or 4)	21.6779 N=149
Movers Strong Urban to Rural	(5 or 4) to (1 or 2)	22.6786 N=56
Movers Strong Rural to Urban	(1 or 2) to (5 or 4)	22.5313 N=96

The results of this analysis are interesting, not least because they raise questions about the oversimplified conventional method of measuring rural versus urban. The strongest NEP environmental worldview scores did not come from urban areas, as much research suggests. Instead, the strongest environmental worldview scores belong to the “movers”—individuals who grew up in a place at one end of the rural-urban spectrum who then moved to the opposite end for the majority of their adult life. In fact, individuals who grew up in urban areas before the age of 18 and then spent the majority of their adult lives in rural areas held the strongest environmental values (22.68). The

other “mover” group-- individuals who grew up in rural areas and then lived the majority of their lives in urban areas—had the second highest average NEP score at 22.53. By comparison, those who grew up in urban areas over the size of 100,000 (5 or 4 in Table 14) and lived the majority of their adult lives in the same sized area scored an average of 21.6779. However, the three groups denoted as Group B in Table 20, consisting of strongest urban and the two mover groups did not have statistically different average NEP scores after performing two sample T-tests. Group B also contrasts with Group A, which consists of the strongest rural and middle categories, both of which had not only lower NEP scores than Group A, but also statistically significant differences vis-à-vis Group A.

These results raise a number of interesting questions that pose challenges to the conventional method of measuring rural and urban. For while the rural-urban differences on environmental values holds up using the lifetime measure, the case of the two groups of “movers” cannot be accounted for in conventional analyses. This would not be important if “mover” scores were in the middle of the pack, but the individuals who moved from rural to urban areas, and vice versa, hold the strongest environmental values. Who are these people, why did they move, and how did they come to their strong environmental worldviews? Were people moving for jobs or for lifestyle reasons? Did moving expose people to different views and produce stronger environmental worldviews in individuals who experienced a rural and an urban viewpoint? As well, how is it that individuals who started their lives at opposite ends of the rural-urban spectrum nonetheless ended up possessing the same positive and strong environmental worldviews?

Just as importantly, these differences emphasize the crucial importance of analyzing place of residence over the course of a lifetime. Taking current place of residence as definitive means that differences produced by individuals who lived in both rural and urban areas are obscured and left out of the final analysis. Whether analyzing environmental worldviews or other characteristics, there are good reasons for adopting this newer, more refined method for categorizing rural and urban residents in research surveys.

Size of Place and Outdoor Recreation

A final research question concerns whether size of place impacts the overall amount and types of outdoor recreation that individuals are participating in? The total number of times (intensity) individuals participated in outdoor recreation during childhood and adulthood were correlated with size of place during both childhood and adulthood. The results described in Table 23 below.

Table 23. Relationships between Size of Place of Residence and Total Outdoor Recreation Participation

	Size of Place Lived During Respective Period of Life	
Childhood Total Outdoor Recreation Intensity (Number of Times Participating per year)	Pearson Correlation	-.178**
	Sig. (2-tailed)	.000
	N	1277
Adulthood Total Outdoor Recreation Intensity (Number of Times Participating per year)	Pearson Correlation	-.172**
	Sig. (2-tailed)	.000
	N	1288
** . Correlation is significant at the 0.01 level (2-tailed).		

There was a weak negative correlation of -0.178, significant at the 0.000 level between the average total number of days participating outdoor recreation each year as a child before the age of 12 and the size of place that individuals spent their childhood in.

The larger the size of place that survey respondents spent their childhood, the less they participated in outdoor recreation. A very similar relationship was observed during adulthood, with a correlation of -0.167 with significance to the 0.000 level. Thus, adults from the survey population who lived in larger areas once again participated fewer times in less outdoor recreation activities than those who lived in smaller sized areas. Clearly, there is a weak relationship between size of place and the amount of outdoor recreation that individuals participate in.

Size of Place and Type of Outdoor Recreation Activities

By separating different types of outdoor recreation activities, we investigated whether the types of outdoor recreation activities that people living in different sized places vary. In Table 24, the traditional measure of size of place, current place of residence, is used to calculate the average proportion of each category of recreation activity participated in by urban, middle, and rural dwellers.

Table 24. Average Proportion Participation in Recreation Categories by Current Size of Place Answer

Childhood			
	Appreciative	Motorized	Consumptive
Urban	0.7119	0.0748	0.1685
Middle	0.6672	0.0711	0.2215
Rural	0.6318	0.081	0.2339
Adulthood			
Urban	0.7432	0.0591	0.1386
Middle	0.6137	0.106	0.2298
Rural	0.6059	0.1132	0.2455

Based on current size of place there are definite differences in the types of outdoor recreation activities that individuals participate in. The largest and most statistically significant differences were between the proportion appreciative outdoor

recreation activity and the proportion consumptive outdoor recreation activity that individuals participated in. Children who grew up primarily in urban areas participated in an average of 71.19% appreciative outdoor recreation activity, 8.01% more on average, than individuals growing up in rural areas. Residents living in middle-sized areas participated in an intermediate level of appreciative outdoor recreation activity, on average, 66.72%. The difference between urban and rural childhood proportion consumptive activity was roughly the same, with a difference of 6.54%. Rural children participated in the highest proportion of consumptive recreation activity, 23.39% on average. The proportion of motorized recreation activity participation was not statistically different amongst the different sized places.

Amongst adults the differences were more pronounced, with urban individuals participating in 13.73% more appreciative activity on average than rural individuals. The difference in proportion participation in consumptive activity also grew to over 11%, with urban adults only participating spending 13.86% of their outdoor recreation time doing consumptive activities.

To dig deeper, the updated and more accurate definitions of the size of place, size of place lived in during the majority of childhood and adulthood, were used to analyze the proportion of different types of activities that respondents participated in with results shown in Table 25.

Table 25. Size of Place Lived During Childhood and Adulthood Compared to Type of Activity Proportion Participation **Intensity** Percentages (Based on times participated in each activity)

	Appreciative	Motorized	Consumptive
Childhood			
Urban	68.90%.	6.92%	17.43%
Middle	66.96 %	8.07 %	21.38 %
Rural	63.16 %	7.80 %	24.41 %

Adulthood			
Urban	67.26 %	8.44 %	18.10 %
Middle	62.37 %	10.53 %	23.09 %
Rural	59.80 %	11.47%	25.25 %

The differences between the various categories of outdoor recreation mirrored the results from above while taking current place of residence as definitive. These differences were not as large overall but still marked and significant differences. The spread between urban childhood participation in appreciative outdoor recreation intensity and rural appreciative outdoor recreation intensity was 5.74% while among adults this difference grew to 7.46%. For proportion consumptive outdoor recreation activity the difference among childhood participants was 6.98% while amongst adults there was a 7.25% difference. In motorized outdoor recreation there was a spread of 3.03% with rural residents again participating in a higher percentage of these activities.

Together, these results show that rural residents participate in slightly more outdoor recreation and that urban and rural residents participate in different kinds of outdoor recreation. Urban residents were more likely to participate in a greater proportion of appreciative outdoor recreation while rural residents were more likely to participate in higher proportions of consumptive and motorized outdoor recreation activities.

Outdoor Recreation Type and Size of Place Correlations

Rather than solely showing how size of place of residence is separated into different averages, using the various size of place scales and different proportions of activity participation, a variety of correlations can be run. The results of these

correlations are displayed in Tables 26 and 27 for both childhood size of place and adult size of place, respectively.

Table 26. Correlation between the Size of Place Lived in for the Majority of Childhood and Proportion Participation in Different Types of Activity During Childhood

		Size of Place Lived in for Majority of Childhood
Proportion Appreciative Outdoor Recreation Times Per Year during Childhood	Pearson Correlation Sig. (2-tailed) N	.096** 0.001 1277
Proportion Motorized Outdoor Recreation Times Per Year during Childhood	Pearson Correlation Sig. (2-tailed) N	-0.013 0.648 1277
Proportion Consumptive Outdoor Recreation Times Per Year during Childhood	Pearson Correlation Sig. (2-tailed) N	-.162** 0.000 1277
**. Correlation is significant at the 0.01 level (2-tailed).		

A weak positive correlation exists between the size of place lived in during the majority of childhood and the proportion of appreciative outdoor recreation times participated in during childhood for our survey population. A correlation of 0.096 with significance to the 0.001 level suggests a very weak relationship between more appreciative outdoor recreation activity participation in larger, more urban areas. While there was no observed relationship between the proportion of motorized outdoor recreation activity, there was a weak negative correlation of -0.162 with significance to 0.000, between the proportion of consumptive outdoor recreation participated in as a child and the size of place. This suggests that folks from smaller, less populous areas participate more in consumptive outdoor recreation in comparison to other sizes of place. These numbers match up with our previous analysis in tabular form. Table 27 performs the same analysis as the previous table but for adulthood.

Table 27. Correlation Between Size of Place Lived for the Majority of Adulthood and Proportion Participation in Different Types of Activity During Adulthood

		Size of Place Lived in for Majority of Adulthood
Proportion Appreciative Outdoor Recreation Times Per Year as an Adult	Pearson Correlation Sig. (2-tailed) N	.172** .000 1283
Proportion Motorized Outdoor Recreation Times Per Year as an Adult	Pearson Correlation Sig. (2-tailed) N	-.072* .002 1283
Proportion Consumptive Outdoor Recreation Times Per Year as an Adult	Pearson Correlation Sig. (2-tailed) N	-.219** .000 1283
**. Correlation is significant at the 0.01 level (2-tailed).		

Again, a weak relationship exists between size of place and proportion appreciative outdoor recreation activity as adults, with a correlation of 0.172 with significance to the 0.000 level. In the case of adults, both the proportion of motorized outdoor recreation activity and the proportion of consumptive outdoor recreation activity were negatively correlated with size of place, at -0.072 and -0.219 with significance to the 0.002 and 0.000 levels respectively. This again suggests that for our survey population, adults in urban areas are more likely to engage in appreciative outdoor recreation activities than are adults in rural, non-populous areas who are more likely to participate in consumptive or motorized outdoor recreation activities.

Summary of Size of Place Analysis

In summary, there is a weak relationship of 0.083 with significance to 0.003 between size of place and NEP environmental worldviews. Individuals living in more urban areas tend to have slightly stronger environmental worldviews and while this relationship was weak it was statistically significant. There are very interesting

relationships between size of place lived during childhood and during adulthood and environmental worldviews. When broken into different categories, people who move between urban and rural areas as children and adults have the strongest environmental worldviews when compared to other groups, with average NEP scores of 22.68 and 22.53. We can only speculate as to why this occurs. People may benefit from higher education levels and income that tend to exist in more urbanized areas and some have hypothesized that these differences lead to stronger environmental worldviews. If the people who moved from rural areas and obtained these characteristics perhaps this is why they have stronger environmental worldviews. On the other side, while reasons for moving were not surveyed, those moving from urban areas may have experienced these other factors and chosen to move to rural areas for lifestyle reasons and still held the environmental worldviews that they developed in their childhood etc.

There is a weak relationship between size of place and the total outdoor recreation activity intensity, with individuals in rural areas having more outdoor recreation experiences. We observed a correlation of -0.172 between place of residence and total adult outdoor recreation activity and a correlation of -0.172 for childhood outdoor recreation activity intensity. Children and adults living in urban areas (based on living there for the majority of childhood or adulthood) participated in more appreciative outdoor recreation activity proportionally and less consumptive outdoor recreation activity while rural individuals displayed converse tendencies. Childhood and adulthood average proportion appreciative outdoor activity were both greater than 67% for urban individuals. Proportion appreciative outdoor recreation activity on average, only made up 61.16% of rural children's total activity and 59.80% for rural adults. The second greatest

discrepancy was between adulthood proportion consumptive activity between urban and rural individuals, with rural individuals participating in an average of 7.15% more consumptive activity. Individuals living in middle-sized areas participated in intermediate levels of each category of outdoor recreation activity. These relationships between place of residence and categories were confirmed through correlation as well.

Childhood-Adulthood Relationships

The last part of the third research question addressed in this study concerns how childhood compares to adulthood, for both participation in outdoor recreation and size of place. The unique survey questions asked in this study allow for a comparison between intensity and type of outdoor recreation activities that individuals participated in.

Accordingly, the intensity that each individual participated in each activity as a child--the average number of times they engaged in an activity each year--can be correlated to the average number of times they do that same activity during adulthood. Table 28 lists the ten activities with the highest correlations. (Appendix Table A7 shows every activity.)

Table 28. Outdoor Recreation Activity, Childhood compared to Adulthood

Activities		
Collecting (rocks, plants, mushrooms, berries)	Pearson Correlation	.649**
	Sig. (2-tailed)	.000
	N	1305
Hunting (gun)	Pearson Correlation	.609**
	Sig. (2-tailed)	.000
	N	1298
Bird or wildlife watching	Pearson Correlation	.573**
	Sig. (2-tailed)	.000
	N	1302
Fishing (spinners/hardware and/or bait)	Pearson Correlation	.552**
	Sig. (2-tailed)	.000
	N	1304

Other	Pearson Correlation	.540**
	Sig. (2-tailed)	.000
	N	1305
Playing in the woods/forest	Pearson Correlation	.529**
	Sig. (2-tailed)	.000
	N	1303
Hunting (bow)	Pearson Correlation	.523**
	Sig. (2-tailed)	.000
	N	1298
Outdoor scenic photography	Pearson Correlation	.492**
	Sig. (2-tailed)	.000
	N	1304
Off-road vehicle travel (ATVs; 4-wheel drive vehicles; dune buggies; motorcycles/motocross; etc.)	Pearson Correlation	.475**
	Sig. (2-tailed)	.000
	N	1299
Swimming or playing in lakes, rivers, ocean	Pearson Correlation	.475**
	Sig. (2-tailed)	.000
	N	1303
**. Correlation is significant at the 0.01 level (2-tailed).		

For our survey population every outdoor recreation activity *except for* parasailing or hang gliding and motorized parasailing or hang gliding, show positive correlations between childhood participation in an activity and adult participation in an activity with significance to the 0.01 level. Most activities show strong correlation between childhood and adulthood ranging from 0.400-0.600. This means that the types of activities and the intensity of participation in those activities as children are highly related to the types and intensity of outdoor recreation as adults. In fact, when the total intensity of outdoor recreation activity participation during childhood is compared to the total intensity of outdoor recreation participation during adulthood, there is a strong positive relationship of 0.665 with significance to the 0.000 level. These results are displayed in Table 29 below.

Table 29. Childhood and Adulthood Intensity of Outdoor Recreation Participation Comparison

		Childhood Total Intensity of Outdoor Recreation Activity Participation in (Avg. Number Of Times Participating per Year)
Adulthood Total Intensity of Outdoor Recreation Activity Participation in (Avg. Number Of Times Participating per Year)	Pearson Correlation	.665**
	Sig. (2-tailed)	.000
	N	1305
**. Correlation is significant at the 0.01 level (2-tailed).		

Conclusions/Discussion

The rapid growth of outdoor recreation activities over the past 40 to 50 years means that more and more people are interacting with, and experiencing the joys of natural settings. If Aldo Leopold were still alive he likely would be surprised to see the range of activities as well as the intensity with which so many individuals choose to recreate in the great outdoors. Just as importantly, U.S. citizens are valuing the environment and environmental protection much more than 40 to 50 years ago. Some scholars have picked up on these trends and argued that there are important connections between an individual's environmental worldviews and their choices of outdoor recreation activities, while others have argued the opposite—that childhood contact with nature leads to stronger environmental worldviews as adults. In addition, there is research that finds substantial differences between urban and rural residents when it comes to environmental worldviews. This senior thesis has tested these various hypotheses and findings on a large population of both rural and urban Oregon residents.

The survey data show little support for a key hypothesis associated with Richard Louv's bestseller book, *Last Child in the Woods*. In other words, early childhood nature contact through outdoor recreation *does not appear* to lead to stronger environmental worldviews as an adult. These results are obtained whether the test is conducted using the traditional, simple method of measuring outdoor recreation activities or my new, more robust, "intensity" measure. An extension of the Louv hypothesis to particular types of outdoor recreation activities, however, does show a connection, although it is quite

weak, between childhood participation in *appreciative* outdoor recreation and stronger environmental worldviews later in life.

This research also finds that individuals in urban areas tend to have somewhat stronger environmental worldviews than those in rural areas, though not by much. Yet, by employing an innovative new “lifetime” measure of urbanness versus ruralness, the results present a puzzle for the conventional wisdom in this area. The puzzle involved the “movers,” or those who move from heavily rural to strong urban, and vice versa. It is these groups of respondents, regardless of the direction of their move, who have the strongest environmental worldviews. This finding suggests that the relationship between size of place and environmental worldviews is more complicated than conventional studies let on.

The Implications for Public Policy and General Recreation Trends

The findings presented in this thesis have implications for public policy and public land managers, while also allowing insights into important outdoor recreation use trends. These include:

- land management policies concerning outdoor recreation,
- understanding the connection between childhood recreation activities and future recreation trends,
- stronger growth in appreciative outdoor recreation activities,
- implications for environmental advocacy organizations and education policy,
- other benefits of outdoor recreation participation.

First, determining the actual use, or participation rates for different outdoor recreation activities is crucially important for land managers because they tell them how the public prefers to interact with nature. Specifically, if certain activities experience high levels of participation, policymakers need to know what these activities are and how the participation rates are changing and projected to change. Policymakers need to know these facts so that they can make informed decisions when planning how to use public and private lands and waters. Even more important than the basic level of participation by the public is the actual number of times that certain recreation activities are being participated in. These numbers tell decision makers the real impact of the activity on nature as well as the real demand for an activity. Policymakers can decide whether certain activities are producing too much strain on ecosystems with participation intensity data. If for example, off-road vehicles are growing vastly more popular and putting pressure on ecosystems, policymakers need to consider whether specific routes should be planned on public lands. As another option in the policy quiver, land managers also might decide that due to burgeoning participation, new areas need to be developed for off-road vehicle use.

Second, there is a very strong positive correlation between both the amount of outdoor recreation that individuals participate in and the types of outdoor recreation that individuals participate in as children and then as adults. Thus following the trends of outdoor recreation participation amongst young people today is extremely important because youth participation predicts future outdoor recreation use. In short, what youth are participating in now will have major implications for the types of outdoor recreation

that will be demanded in the next 20, 40, or 60 years. This study shows that what kids participate in matters significantly as they are likely to keep doing it. Individuals are going to continue to demand more appreciative outdoor recreation opportunities if youth are participating in these activities. Public policy planners and land managers must take this into account as they project land use into the future and plan on new management structures. Land use planning requires long-term foresight. One only needs to look as far as current Oregon politics where the land management structures, specifically urban growth boundaries formed 40 years ago are now facing intense political scrutiny with many legislators calling for an update in public policy. If these policies are to be best managed and planned for, the outdoor recreation activities and participation patterns of youth in these areas must be considered.

Third, the activities experiencing the greatest growth among Oregon residents *between childhood and adulthood* (see Table 31) were appreciative outdoor recreation activities (10 of the top 12). The data thus support the larger national trend in this regard. Bow hunting on this list, showed large increases because this is an activity that requires a good deal of strength and thus would be participated in by adults far more often than children. Off-road vehicle travel was the other non-appreciative activity on this list of 12 activities and also happens to be one of the fastest growing outdoor recreation activities nationally over the past thirty years.

Table 31. 12 Fastest Growing Activities by Change in Outdoor Recreation Intensity (overall times participated in) from Childhood to Adulthood

Activity	% Change in Intensity of Participation Childhood-Adulthood
Windsurfing	1231.0%
Parasailing or hang-gliding	429.0%
RV/tow-behind trailer camping	181.2%
Trailrunning	136.4%

River rafting or kayaking	129.2%
Outdoor scenic photography	124.8%
Cross-country skiing	112.6%
Snowshoeing	105.8%
Hunting (bow)	95.4%
Mountain Biking	94.4%
Off-road vehicle travel	82.7%
Bird or wildlife watching	57.9%

*See Appendix Table A7 for a complete breakdown of all activities

Overall, these results support the narrative developed earlier, with increasing appreciative outdoor recreation participation. These results help explain why Sally Jewell, former CEO of REI, is now head of the Department of Interior. Management structures will continue to shift in the coming years with more appreciative recreation experts and industries continuing to influence public policy. Public land managers will also need to come from or have experience with, appreciative outdoor recreation activity management. The public's increasing demand for appreciative recreation opportunities will push this shift into the future.

Fourth, appreciative outdoor recreation participation levels displayed a stronger relationship with positive environmental worldviews in adults than in children. This supports some evidence, suggested by Thapa (2010) and Cordell, Green, and Betz (2002) who report that differences in environmental worldviews translate into different preferences for types of nature-related recreational activities. A reasonable conclusion is that stronger environmental worldviews might encourage more appreciative outdoor recreation, rather than the inverse relationship. Thus with increasing support for stronger environmental worldviews on a national scale, land managers can also expect a continued increase in demand for appreciative recreation activities.

Fifth, one of the most important implications of these conclusions are reserved for environmental advocacy groups and conservation organizations. There is not strong

evidence for outdoor recreation participation producing stronger environmental worldviews. Stronger environmental worldviews come from other places, perhaps from education, parental socialization, or significant life experiences. The belief of many environmental organizations that simply getting youth out in nature will produce stronger environmental worldviews does not hold water. The Sierra Club believes that those who “experience wilderness firsthand are much more likely to preserve it for future generations” (Sierra Club, 2013). The National Wildlife Federation suggests that early life outdoor experiences are the most important factor in developing an environmental ethic and even developed a report, *Connecting Today’s Kids with Nature A Policy Action Plan* based on this flawed assumption (White, 2008). While these efforts combined with education or other activities may produce stronger environmental worldviews, the activities on their own do not produce stronger environmental worldviews. Advocacy groups seeking to produce stronger environmental worldviews in the general public must take the results from this study into consideration.

Finally, there are other benefits of outdoor recreation that have been documented by a multitude of researchers. Taylor, Kuo, and Sullivan (2001) find that children suffer from less attention deficit symptoms and function better overall after participating in activities in outdoor settings. Wells and Evans (2003) find that children near to more nature in rural areas experience lower impacts from life stress than those without less nature. Louv (2008), in his second book, extols the benefits of nature *for adults*. He takes and melds a vast body of health data indicating that outdoor recreation is an extremely positive experience, and can be a major help in the fight against obesity and struggle to simply maintain health. Yet, currently rural children and rural adults are participating in

outdoor recreation activities at higher levels than urban residents. This suggests that to the extent individuals in urban areas can be provided with more outdoor recreation opportunities they increase the likelihood that they will enjoy better health outcomes.

Direction of Future Research

This particular field of research has a multitude of questions that still need answering. Appreciative, consumptive, and motorized categories of outdoor recreation are a starting point for analyzing outdoor recreation participation but research should try to find different ways of analyzing type of recreation. Some studies have started to think of activities in terms of more or less resource consumption or impact (eg. Theodori, Luloff, & Willits, 1998). However this concept has not been very well developed in the literature. In this analysis there was no real way to separate between hiking and mountain biking but mountain biking tends to be a bit more destructive to trails and the environment while hiking tends to be purely appreciative of nature. It might be worthwhile to investigate further splitting up activities in different groupings to see if that impacts how they are related to environmental worldviews. More nuanced and specific separation of outdoor recreation activities might show activities that are more predictive of future environmental worldviews or at least provide interesting insights.

The data in this study provide an opportunity for another interesting avenue of research. An interesting question lies in combining type of activity participation and the intensity of participation in that type of activity. Essentially finding out whether there are differences in people who participate in mainly appreciative types of outdoor recreation,

the individuals who participate at the highest levels, and those who participate only occasionally. Due to time constraints this question was not integrated into the current thesis, however, the differences between these different groups would provide important insights.

Combining the frequency measures developed here, with significant life experiences/significant activities research that others have performed might increase the value of the research and relationships. Asking for a list of the 3-4 most important types of outdoor recreation activities in shaping survey respondents perspectives as perceived by survey respondents would improve the research. Some activities might have been, or be very important to an individual but they simply do not have the opportunity to participate very often in them.

The studies that document the strongest the connections between outdoor recreation and future environmental worldviews were performed on folks who were activists or engaged in environmental careers. These people might be have a special type of experience when connecting with outdoor recreation, they might be learning leave no trace ethics, public land management respect, an appreciation for natural beauty, or a distaste for encroachment by dirty industries on those places as taught or elucidated by a parent or teacher. Digging deeper into how individuals are interacting with nature during their nature contact is a worthwhile place to investigate.

It would be incredibly valuable to follow a group of individuals over a long period of time and assess how individuals are participating in outdoor recreation, where they are living, and how their environmental worldviews are changing or being impacted. This kind of longitudinal study could elucidate a number of questions in the literature and

could better investigate causation. This would be of incredible importance as one of the most unique findings in this study was that individuals who moved from urban areas to rural areas and vice versa, held the strongest environmental worldviews. Finding why this is happening would have incredible impacts on planning initiatives and modeling of future behavior. With more people moving to urban areas over the past 40 years, this could be a big part of the shift in environmental worldviews that has also occurred over the past 40 years. Finding the reasons and connections between these two would help city planners and public policy officials.

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APPENDIX A

Table A1. Childhood: Average Number of Times Participating, All Activities, Percent of Survey Population Participating (Percent of Respondents, Count of Respondents)

Activities	None	1-2	3-5	6-10	11-20	20+	Overall Participation
1. Tent camping	33.5%, n=437	16.6%, n=217	16.6%, n=217	17.9%, n=234	9.3%, n=121	6.1%, n=79	66.5%, n=868
2. RV/tow-behind trailer camping	77.2%, n=1007	5.3%, n=69	5.8%, n=76	5.4%, n=70	2.9%, n=38	3.4%, n=45	22.8%, n=298

3. Fishing (spinners/hardware and/or bait)	25%, n=326	14.9%, n=194	15.5%, n=202	13.2%, n=172	13%, n=169	18.5%, n=241	75%, n=978
4. Flyfishing	78.9%, n=1029	6.1%, n=80	4.7%, n=61	4.1%, n=53	2.8%, n=37	3.4%, n=45	21.1%, n=276
5. Hiking	30.7%, n=401	16.9%, n=220	16.2%, n=212	15.5%, n=202	7.9%, n=103	12.8%, n=167	69.3%, n=904
6. Bird or wildlife watching	55.2%, n=719	13.4%, n=174	11%, n=143	6.4%, n=83	3.8%, n=50	10.3%, n=134	44.8%, n=584
7. River rafting or kayaking	82.7%, n=1079	7.4%, n=96	4.5%, n=59	2.4%, n=31	1.2%, n=16	1.8%, n=24	17.3%, n=226
8. Off-road vehicle travel (ATVs; 4-wheel drive vehicles; dune buggies; motorcycles/motocross; etc.)	79.6%, n=1035	5%, n=65	3.6%, n=47	3.4%, n=44	2.2%, n=29	6.2%, n=81	20.4%, n=266
9. Motorboating	54.2%, n=707	14.6%, n=190	10.7%, n=139	6.4%, n=84	6%, n=78	8.2%, n=107	45.8%, n=598
10. Canoeing	78.1%, n=1019	9.7%, n=127	5.2%, n=68	2.8%, n=37	1.9%, n=25	2.2%, n=29	21.9%, n=286
11. Swimming or playing in lakes, rivers, ocean	15.7%, n=207	10.2%, n=133	15.1%, n=197	15.8%, n=206	11.8%, n=154	31.4%, n=410	84.3%, n=1100
12. Backpacking	69.8%, n=909	10.3%, n=134	8.6%, n=112	4.5%, n=58	2.3%, n=30	4.6%, n=60	30.2%, n=394
13. Playing in the woods/forest	23.7%, n=309	11.9%, n=155	13.2%, n=172	12.1%, n=158	9.8%, n=128	29.3%, n=383	76.3%, n=996
14. Cross-country skiing	92.9%, n=1210	3.7%, n=48	1.5%, n=19	0.5%, n=7	0.5%, n=6	1%, n=13	7.1%, n=93
15. Downhill skiing/snowboarding/telemarking	83.5%, n=1096	5.3%, n=70	3.8%, n=50	2.4%, n=31	1.1%, n=15	3.3%, n=43	16.5%, n=209
16. Water skiing	75.2%, n=981	9%, n=118	6%, n=78	4.4%, n=58	1.6%, n=21	3.8%, n=49	24.8%, n=324
17. Snowshoeing	94.6%, n=1234	2.3%, n=30	1%, n=13	0.8%, n=11	0.5%, n=7	0.7%, n=9	5.4%, n=70
18. Hunting (guns)	60.4%, n=788	7.3%, n=95	8.4%, n=110	8.7%, n=114	4.8%, n=62	10.4%, n=136	39.6%, n=517
19. Hunting (bow)	94%, n=1227	1.3%, n=17	0.8%, n=11	1.4%, n=18	1%, n=13	1.5%, n=19	6%, n=78
20. Windsurfing	99.4%, n=1297	0.5%, n=6	0.1%, n=1	0.1%, n=1	0%, n=0	0%, n=0	0.6%, n=8
21. Surfing	95.5%, n=1246	1.9%, n=25	0.9%, n=12	0.8%, n=11	0.1%, n=1	0.8%, n=10	4.5%, n=59

22. Parasailing or hang-gliding	99.5%, n=1299	0.4%, n=5	0%, n=1	0.1%, n=0	0%, n=0	0%, n=0	0.5%, n=6
23. Motorized parasailing or gliding	99.6%, n=1300	0.1%, n=1	0.2%, n=2	0%, n=0	0%, n=2	0.2%, n=0	0.4%, n=5
24. Snowmobiling	90.8%, n=1185	3.7%, n=48	2.5%, n=33	0.7%, n=9	0.3%, n=4	2%, n=26	9.2%, n=120
25. Trailrunning	94.8%, n=1237	1.7%, n=22	1.8%, n=23	0.9%, n=12	0.2%, n=3	0.6%, n=8	5.2%, n=68
26. Mountain biking	91.5%, n=1192	2.1%, n=28	2.4%, n=31	1.5%, n=19	0.8%, n=10	1.8%, n=23	8.5%, n=111
27. Road cycling (touring)	88%, n=1145	3.1%, n=40	1.7%, n=22	1.5%, n=20	1.2%, n=15	4.5%, n=59	12%, n=156
28. Collecting (rocks, plants, mushrooms, berries, etc.)	40.8%, n=532	14.2%, n=185	14.1%, n=184	11.3%, n=148	7.4%, n=97	12.2%, n=159	59.2%, n=773
29. Outdoor scenic photography	72.1%, n=941	9.7%, n=127	6.4%, n=84	3.7%, n=48	2.9%, n=38	5.1%, n=67	27.9%, n=364
30. Rock climbing	85%, n=1108	6.1%, n=80	4.1%, n=53	1.8%, n=23	1.4%, n=18	1.7%, n=22	15%, n=196
31. Sledding (snow)	38.2%, n=498	14.7%, n=191	16.8%, n=219	11.7%, n=152	6.7%, n=87	12%, n=156	61.8%, n=805
32. Other	86.1%, n=1123	2.1%, n=28	2.4%, n=31	1.8%, n=24	1.7%, n=22	5.9%, n=77	13.9%, n=182
	N=1313						

Table A2. Adulthood: Average Number of Times Participating, All Activities, Percent of Survey Population Participating (Percent of Respondents, Count of Respondents)

Activities	None	1-2	3-5	6-10	11-20	20+	Overall Participation
1. Tent camping	21.5%, n=281	20.4%, n=266	20.7%, n=271	17.7%, n=231	9.3%, n=121	10.5%, n=137	78.5%, n=1026
2. RV/tow-behind trailer camping	50.6%, n=661	7.5%, n=98	9.5%, n=124	11.7%, n=153	7.9%, n=103	12.9%, n=168	49.4%, n=646
3. Fishing (spinners/hardware and/or bait)	30.5%, n=399	13.8%, n=181	13.5%, n=177	11.9%, n=156	9.9%, n=129	20.3%, n=265	69.5%, n=908
4. Flyfishing	70.6%, n=923	10.2%, n=134	6.6%, n=86	4.4%, n=58	3.3%, n=43	4.9%, n=64	29.4%, n=385
6. Bird or wildlife watching	40.1%, n=525	12.7%, n=166	13.7%, n=179	10.3%, n=135	6%, n=79	17.3%, n=226	59.9%, n=785

7. River rafting or kayaking	56.3%, n=737	19.6%, n=256	12.2%, n=160	5.7%, n=74	2.4%, n=31	3.9%, n=51	43.7%, n=572
8. Off-road vehicle travel (ATVs; 4-wheel drive vehicles; dune buggies; motorcycles/motocross; etc.)	63.8%, n=835	8.2%, n=107	5.5%, n=72	6.4%, n=84	6.1%, n=80	10%, n=131	36.2%, n=474
9. Motorboating	50.9%, n=665	14.2%, n=186	9.7%, n=127	9.6%, n=126	4.5%, n=59	11%, n=144	49.1%, n=642
10. Canoeing	71.2%, n=932	14.3%, n=187	6%, n=79	4.1%, n=54	2%, n=26	2.4%, n=31	28.8%, n=377
11. Swimming or playing in lakes, rivers, ocean	23.1%, n=302	15.7%, n=206	20.5%, n=268	14.3%, n=187	8%, n=105	18.4%, n=241	76.9%, n=1007
12. Backpacking	60.9%, n=798	13.3%, n=175	12.9%, n=169	6.2%, n=81	3%, n=39	3.7%, n=49	39.1%, n=513
13. Playing in the woods/forest	27.7%, n=362	13.4%, n=176	16.6%, n=218	11.3%, n=149	9.9%, n=130	20.9%, n=274	72.3%, n=947
14. Cross-country skiing	80.2%, n=1051	10.2%, n=134	4.2%, n=55	3.7%, n=48	0.8%, n=11	0.9%, n=12	19.8%, n=260
15. Downhill skiing/snowboarding/telemarking	74.6%, n=978	9.8%, n=128	5.4%, n=71	4.7%, n=62	2.1%, n=28	3.4%, n=44	25.4%, n=333
16. Water skiing	76.6%, n=997	10.1%, n=131	5%, n=65	3.9%, n=51	1.8%, n=23	2.7%, n=35	23.4%, n=305
17. Snowshoeing	84.6%, n=1103	8.1%, n=105	3.2%, n=42	2.6%, n=34	0.3%, n=4	1.2%, n=16	15.4%, n=201
18. Hunting (guns)	59.9%, n=781	6.4%, n=83	7.6%, n=99	7.4%, n=96	5.8%, n=76	12.9%, n=168	40.1%, n=522
19. Hunting (bow)	88.5%, n=1153	2.5%, n=33	2.4%, n=31	1.7%, n=22	1.5%, n=20	3.4%, n=44	11.5%, n=150
20. Windsurfing	96.6%, n=1262	1.5%, n=20	0.8%, n=11	0.4%, n=5	0.4%, n=5	0.3%, n=4	3.4%, n=45
21. Surfing	94.1%, n=1234	3.1%, n=40	1.2%, n=16	0.4%, n=5	0.2%, n=3	1%, n=13	5.9%, n=77
22. Parasailing or hang-gliding	98.2%, n=1287	1.5%, n=20	0.2%, n=2	0%, n=0	0%, n=0	0.2%, n=2	1.8%, n=24
23. Motorized parasailing or gliding	98.9%, n=1297	0.7%, n=9	0.2%, n=2	0.1%, n=1	0.2%, n=2	0%, n=0	1.1%, n=14
24. Snowmobiling	85.8%, n=1125	6%, n=79	3.2%, n=42	1.5%, n=20	1.1%, n=14	2.4%, n=31	14.2%, n=186
25. Trailrunning	89.4%, n=1170	3.7%, n=48	2.7%, n=35	1.9%, n=25	0.5%, n=7	1.8%, n=24	10.6%, n=139

26. Mountain biking	81.2%, n=1065	5.6%, n=73	5.9%, n=78	2.7%, n=36	1.2%, n=16	3.3%, n=43	18.8%, n=246
27. Road cycling (touring)	80.7%, n=1056	5%, n=66	3.8%, n=50	2.7%, n=35	2.4%, n=31	5.4%, n=71	19.3%, n=253
28. Collecting (rocks, plants, mushrooms, berries, etc.)	41.3%, n=542	15.3%, n=201	14.3%, n=188	10%, n=131	5.3%, n=69	13.7%, n=180	58.7%, n=769
29. Outdoor scenic photography	45.1%, n=591	12.7%, n=167	14%, n=184	10.3%, n=135	6%, n=78	11.8%, n=155	54.9%, n=719
30. Rock climbing	88.4%, n=1159	6.5%, n=85	3.2%, n=42	0.8%, n=10	0.8%, n=10	0.4%, n=5	11.6%, n=152
31. Sledding (snow)	69%, n=904	12.7%, n=167	10.5%, n=138	3.2%, n=42	1.4%, n=19	3.1%, n=41	31%, n=407
32. Other	83.4%, n=1094	2.3%, n=30	2.9%, n=38	2.4%, n=32	2.2%, n=29	6.7%, n=88	16.6%, n=217

Table A3. Childhood Outdoor Recreation Intensity Compared to Traditional Measurement Method (All Activities)

	Childhood Total Intensity Score (Times activity was Participated in by all respondents)	Total # of Participants in Activity	% Difference Between Total Number of Participants and Intensity	Average Level of Participation (Times per Year for Participating Children)
Swimming or playing in lakes, rivers, ocean	14042.5	1098	171.0	12.789
Playing in the woods/forest	12594.5	996	170.7	12.645
Fishing (spinners/hardware and/or bait)	10396.5	978	165.6	10.630
Hiking	8064.5	904	159.7	8.921
Collecting (rocks, plants, mushrooms, berries)	7199	773	161.2	9.313
Sledding (snow)	7159	805	159.6	8.893
Tent camping	6679	868	154.0	7.695
Hunting (gun)	5447.5	517	165.3	10.537
Bird or wildlife watching	5220	584	159.8	8.938
Motorboating	5076	598	157.8	8.488
Outdoor scenic photography	2973.5	364	156.4	8.169
Backpacking	2898	394	152.1	7.355

Off-road vehicle travel	2869	266	166.1	10.786
RV/tow-behind trailer camping	2546.5	298	158.1	8.545
Other	2393	182	171.7	13.148
Water skiing	2356.5	324	151.7	7.273
Flyfishing	2351.5	276	158.0	8.520
Road Cycling (touring)	1838.5	156	168.7	11.785
Canoeing	1784	284	145.1	6.282
Downhill skiing/snowboarding/tele marking	1731.5	209	156.9	8.285
River rafting or kayaking	1404	226	144.5	6.212
Rock climbing	1279	196	146.8	6.526
Mountain Biking	979	111	159.3	8.820
Snowmobiling	910	120	153.4	7.583
Hunting (bow)	833	78	165.8	10.679
Cross-country skiing	583	93	145.0	6.269
Snowshoeing	491.5	70	150.1	7.021
Trailrunning	443.5	68	146.8	6.522
Surfing	409	59	149.6	6.932
Motorized parasailing or gliding	53.5	5	165.8	10.700
Windsurfing	21	8	89.7	2.625
Parasailing or hang-gliding	15.5	6	88.4	2.583
Total	113042.5	11914	161.9	9.488

Table 4A. Adulthood Outdoor Recreation Intensity Compared to Traditional Measurement Method (All Activities)

	Adult Total Intensity Score (Times Activity was participated in by all respondents)	Total # of Participants in Activity	% Difference Between Total Number of Participants and Intensity	Average Level of Participation (Times Per Year-for Participating Adults)
Hiking	N/A	N/A	N/A	N/A
Playing in the woods/forest	10371	947	166.5	10.951
Fishing (spinners/hardware and/or bait)	10057	908	166.9	11.076
Swimming or playing in lakes, rivers, ocean	9806.5	1007	162.8	9.738
Bird or wildlife watching	8241.5	785	165.2	10.499

Tent camping	8220.5	1026	155.6	8.012
RV/tow-behind trailer camping	7159.5	646	166.9	11.083
Collecting (rocks, plants, mushrooms, berries)	7131	769	161.1	9.273
Outdoor scenic photography	6685.5	719	161.2	9.298
Hunting (gun)	6162.5	522	168.8	11.806
Motorboating	5877.5	642	160.6	9.155
Off-road vehicle travel	5242.5	474	166.8	11.060
Backpacking	3269	513	145.7	6.372
River rafting or kayaking	3218.5	572	139.6	5.627
Flyfishing	3083.5	385	155.6	8.009
Other	2838.5	217	171.6	13.081
Road Cycling (touring)	2621.5	253	164.8	10.362
Downhill skiing/snowboarding/tele marking	2374	333	150.8	7.129
Sledding (snow)	2335	407	140.6	5.737
Canoeing	2113.5	377	139.4	5.606
Water skiing	1991	305	146.9	6.528
Mountain Biking	1903.5	246	154.2	7.738
Hunting (bow)	1627.5	150	166.2	10.850
Snowmobiling	1345.5	186	151.4	7.234
Cross-country skiing	1239.5	260	130.6	4.767
Trailrunning	1048.5	139	153.2	7.543
Snowshoeing	1011.5	201	133.7	5.032
Rock climbing	640.5	152	123.3	4.214
Surfing	496.5	77	146.3	6.448
Windsurfing	279.5	45	144.5	6.211
Parasailing or hang-gliding	82	24	109.4	3.417
Motorized parasailing or gliding	60.5	14	124.8	4.321
Total	118534.5	13301	159.6	8.912

Table A5. Childhood Outdoor Recreation Intensity Table with Calculated Estimated Times of Participation

Activities	1.5	4	8	15.5	22	Total	Avg Level of Participation
32. Other	42	124	192	341	1694	2393	13.148
11. Swimming or	199.5	788	1648	2387	9020	14042.5	12.766

playing in lakes, rivers, ocean							
13. Playing in the woods/forest	232.5	688	1264	1984	8426	12594.5	12.645
27. Road cycling (touring)	60	88	160	232.5	1298	1838.5	11.785
8. Off-road vehicle travel (ATVs; 4-wheel drive vehicles; dune buggies; motorcycles/motocross; etc.)	97.5	188	352	449.5	1782	2869	10.786
19. Hunting (bow)	25.5	44	144	201.5	418	833	10.679
3. Fishing (spinners/hardware and/or bait)	291	808	1376	2619.5	5302	10396.5	10.630
18. Hunting (gun)	142.5	440	912	961	2992	5447.5	10.537
28. Collecting (rocks, plants, mushrooms, berries, etc.)	277.5	736	1184	1503.5	3498	7199	9.313
6. Bird or wildlife watching	261	572	664	775	2948	5220	8.938
5. Hiking	330	848	1616	1596.5	3674	8064.5	8.921
31. Sledding (snow)	286.5	876	1216	1348.5	3432	7159	8.893
26. Mountain biking	42	124	152	155	506	979	8.820
2. RV/tow-behind trailer camping	103.5	304	560	589	990	2546.5	8.545
4. Flyfishing	120	244	424	573.5	990	2351.5	8.520
9. Motorboating	285	556	672	1209	2354	5076	8.488
15. Downhill skiing/snowboarding/tele marking	105	200	248	232.5	946	1731.5	8.285
29. Outdoor scenic photography	190.5	336	384	589	1474	2973.5	8.169
23. Motorized parasailing or gliding	1.5	8	0	31	0	40.5	8.100
1. Tent camping	325.5	868	1872	1875.5	1738	6679	7.695
24. Snowmobiling	72	132	72	62	572	910	7.583
12. Backpacking	201	448	464	465	1320	2898	7.355
16. Water skiing	177	312	464	325.5	1078	2356.5	7.273
17. Snowshoeing	45	52	88	108.5	198	491.5	7.021
21. Surfing	37.5	48	88	15.5	220	409	6.932
30. Rock climbing	120	212	184	279	484	1279	6.526
25. Trailrunning	33	92	96	46.5	176	443.5	6.522

14. Cross-country skiing	72	76	56	93	286	583	6.269
10. Canoeing	190.5	272	296	387.5	638	1784	6.238
7. River rafting or kayaking	144	236	248	248	528	1404	6.212
20. Windsurfing	9	4	8	0	0	21	2.625
22. Parasailing or hang-gliding	7.5	4	0	0	0	11.5	1.917

Table A6. Adulthood Outdoor Recreation Intensity Table with Calculated Estimated Times of Participation

Activities	1.5	4	8	15.5	22	Total	Avg Level of Participation
32. Other	45	152	256	449.5	1936	2838.5	13.081
18. Hunting (guns)	124.5	396	768	1178	3696	6162.5	11.806
2. RV/tow-behind trailer camping	147	496	1224	1596.5	3696	7159.5	11.083
3. Fishing (spinners/hardware and/or bait)	271.5	708	1248	1999.5	5830	10057	11.076
8. Off-road vehicle travel (ATVs; 4-wheel drive vehicles; dune buggies; motorcycles/motocross; etc.)	160.5	288	672	1240	2882	5242.5	11.060
13. Playing in the woods/forest	264	872	1192	2015	6028	10371	10.951
19. Hunting (bow)	49.5	124	176	310	968	1627.5	10.850
6. Bird or wildlife watching	249	716	1080	1224.5	4972	8241.5	10.499
27. Road cycling (touring)	99	200	280	480.5	1562	2621.5	10.362
11. Swimming or playing in lakes, rivers, ocean	309	1072	1496	1627.5	5302	9806.5	9.738
29. Outdoor scenic photography	250.5	736	1080	1209	3410	6685.5	9.298
28. Collecting (rocks, plants, mushrooms, berries, etc.)	301.5	752	1048	1069.5	3960	7131	9.273
9. Motorboating	279	508	1008	914.5	3168	5877.5	9.155
1. Tent camping	399	1084	1848	1875.5	3014	8220.5	8.012
4. Flyfishing	201	344	464	666.5	1408	3083.5	8.009
26. Mountain biking	109.5	312	288	248	946	1903.5	7.738

25. Trailrunning	72	140	200	108.5	528	1048.5	7.543
24. Snowmobiling	118.5	168	160	217	682	1345.5	7.234
15. Downhill skiing/snowboarding/tele marking	192	284	496	434	968	2374	7.129
16. Water skiing	196.5	260	408	356.5	770	1991	6.528
21. Surfing	60	64	40	46.5	286	496.5	6.448
12. Backpacking	262.5	676	648	604.5	1078	3269	6.372
20. Windsurfing	30	44	40	77.5	88	279.5	6.211
31. Sledding (snow)	250.5	552	336	294.5	902	2335	5.737
7. River rafting or kayaking	384	640	592	480.5	1122	3218.5	5.627
10. Canoeing	280.5	316	432	403	682	2113.5	5.606
17. Snowshoeing	157.5	168	272	62	352	1011.5	5.032
14. Cross-country skiing	201	220	384	170.5	264	1239.5	4.767
23. Motorized parasailing or gliding	13.5	8	8	31	0	60.5	4.321
30. Rock climbing	127.5	168	80	155	110	640.5	4.214
22. Parasailing or hang-gliding	30	8	0	0	44	82	3.417

Table A7. Correlations between childhood (preceding age 12) intensity of participation in specific recreation activities and adulthood intensity of participation in same activity

Activities		
Tent camping	Pearson Correlation	.335**
	Sig. (2-tailed)	.000
	N	1305
RV/tow-behind trailer camping	Pearson Correlation	.281**
	Sig. (2-tailed)	.000
	N	1305
Fishing (spinners/hardware and/or bait)	Pearson Correlation	.552**
	Sig. (2-tailed)	.000
	N	1304
Flyfishing	Pearson Correlation	.440**
	Sig. (2-tailed)	.000
	N	1302
Bird or wildlife watching	Pearson Correlation	.573**
	Sig. (2-tailed)	.000
	N	1302
River rafting or kayaking	Pearson Correlation	.318**
	Sig. (2-tailed)	.000
	N	1303
Off-road vehicle travel (ATVs;	Pearson Correlation	.475**

4-wheel drive vehicles; dune buggies; motorcycles/motocross; etc.)	Sig. (2-tailed)	.000
	N	1299
Motorboating	Pearson Correlation	.380**
	Sig. (2-tailed)	.000
	N	1301
Canoeing	Pearson Correlation	.249**
	Sig. (2-tailed)	.000
	N	1303
Swimming or playing in lakes, rivers, ocean	Pearson Correlation	.475**
	Sig. (2-tailed)	.000
	N	1303
Backpacking	Pearson Correlation	.411**
	Sig. (2-tailed)	.000
	N	1303
Playing in the woods/forest	Pearson Correlation	.529**
	Sig. (2-tailed)	.000
	N	1303
Cross-country skiing	Pearson Correlation	.090**
	Sig. (2-tailed)	.001
	N	1303
Downhill skiing/snowboarding/telemarking	Pearson Correlation	.354**
	Sig. (2-tailed)	.000
	N	1305
Water skiing	Pearson Correlation	.273**
	Sig. (2-tailed)	.000
	N	1296
Snowshoeing	Pearson Correlation	.302**
	Sig. (2-tailed)	.000
	N	1297
Hunting (gun)	Pearson Correlation	.609**
	Sig. (2-tailed)	.000
	N	1298
Hunting (bow)	Pearson Correlation	.523**
	Sig. (2-tailed)	.000
	N	1298
Windsurfing	Pearson Correlation	.107**
	Sig. (2-tailed)	.000
	N	1301
Surfing	Pearson Correlation	.193**
	Sig. (2-tailed)	.000
	N	1305
Parasailing or hang-gliding	Pearson Correlation	-.003
	Sig. (2-tailed)	.900
	N	1305

Motorized parasailing or gliding	Pearson Correlation	-.003
	Sig. (2-tailed)	.918
	N	1305
Snowmobiling	Pearson Correlation	.385**
	Sig. (2-tailed)	.000
	N	1305
Trailrunning	Pearson Correlation	.258**
	Sig. (2-tailed)	.000
	N	1303
Mountain Biking	Pearson Correlation	.349**
	Sig. (2-tailed)	.000
	N	1303
Road Cycling (touring)	Pearson Correlation	.246**
	Sig. (2-tailed)	.000
	N	1299
Collecting (rocks, plants, mushrooms, berries)	Pearson Correlation	.649**
	Sig. (2-tailed)	.000
	N	1305
Outdoor scenic photography	Pearson Correlation	.492**
	Sig. (2-tailed)	.000
	N	1304
Rock climbing	Pearson Correlation	.443**
	Sig. (2-tailed)	.000
	N	1304
Sledding (snow)	Pearson Correlation	.391**
	Sig. (2-tailed)	.000
	N	1303
Other	Pearson Correlation	.540**
	Sig. (2-tailed)	.000
	N	1305
Hiking	N/A	
**. Correlation is significant at the 0.01 level (2-tailed).		

APPENDIX B

SURVEY INSTRUMENT:

**Public Attitudes on Outdoor
Recreation Activities in Oregon**

**Study Performed by Oregon State University Student, Elliott Finn
and Professor Ed Weber, School of Public Policy, OSU**



Please return surveys in the prepaid postage envelope to:

**Public Attitudes on Outdoor Recreation Activities in Oregon
School of Public Policy
311 Gilkey Hall
Oregon State University
Corvallis, Oregon 97331-6206
541-737-2811**

ID # _____
[for mailing purposes only]

SECTION 1

In this first section of the survey we would like to ask you some general questions about your interests in, activities relating to and knowledge of outdoor recreation issues in Oregon. Please circle the number that most closely represents your view.

Q-1 Do you like to spend time in and around natural settings such as forests, streams, parks, oceans or lakes?

1. Yes, but only if the weather is pleasant
2. Yes, in all but the worst, or nastiest kind of weather
3. Yes, in all kinds of weather
4. No, not really

Q-2 Do you enjoy participating in outdoor recreation activities?

1. Yes, outdoor recreation is my favorite type of activity
2. Yes, enjoy recreating outdoors
3. Indifferent (no preference)
4. No, prefer doing other things
5. No, avoid at all cost

Q-3 When you consider all the things that you do with your life, how important to you is participating in outdoor recreation activities?

1. Very important
2. Important
3. Somewhat important
4. Not important

Q-3	During your childhood <u>prior to the age of 12</u> , did you participate in any of the following outdoor recreation activities with your family or friends (<i>excluding</i> formally sponsored trips by outdoor organizations such as the Boy Scouts, Girl Scouts, Campfire Girls, church groups, etc.)?.	
		Please indicate the average number of days you recall participating in each

	activity every year					
	None	1-2	3-5	6-10	11-20	20+
1. Tent camping						
	None	1-2	3-5	6-10	11-20	20+
2. RV/tow-behind trailer camping						
3. Fishing (spinners/hardware and/or bait)						
4. Flyfishing						
5. Hiking						
6. Bird or wildlife watching						
7. River rafting or kayaking						
8. Off-road vehicle travel (ATVs; 4-wheel drive vehicles; dune buggies; motorcycles/motocross; etc.)						
9. Motorboating						
10. Canoeing						
11. Swimming or playing in lakes, rivers, ocean						
12. Backpacking						
13. Playing in the woods/forest						
14. Cross-country skiing						
15. Downhill skiing/snowboarding/telemarking						
16. Water skiing						
17. Snowshoeing						
18. Hunting (guns)						
19. Hunting (bow)						
20. Windsurfing						
21. Surfing						
22. Parasailing or hang-gliding						
23. Motorized parasailing or gliding						
24. Snowmobiling						
25. Trailrunning						
26. Mountain biking						
27. Road cycling (touring)						
28. Collecting (rocks, plants, mushrooms, berries, etc.)						
29. Outdoor scenic photography						
30. Rock climbing						
31. Sledding (snow)						
32. Other						

Q-4	As you think about your adult life, which of the following outdoor recreation
------------	---

activities have you participated in?						
	Please indicate the average number of days you recall participating in each activity every year					
	None	1-2	3-5	6-10	11-20	20+
1. Tent camping						
2. RV/tow-behind trailer camping						
3. Fishing (spinners/hardware and/or bait)						
	None	1-2	3-5	6-10	11-20	20+
4. Flyfishing						
6. Bird or wildlife watching						
7. River rafting or kayaking						
8. Off-road vehicle travel (ATVs; 4-wheel drive vehicles; dune buggies; motorcycles/motocross; etc.)						
9. Motorboating						
10. Canoeing						
11. Swimming or playing in lakes, rivers, ocean						
12. Backpacking						
13. Playing in the woods/forest						
14. Cross-country skiing						
15. Downhill skiing/snowboarding/telemarking						
16. Water skiing						
17. Snowshoeing						
18. Hunting (guns)						
19. Hunting (bow)						
20. Windsurfing						
21. Surfing						
22. Parasailing or hang-gliding						
23. Motorized parasailing or gliding						
24. Snowmobiling						
25. Trailrunning						
26. Mountain biking						
27. Road cycling (touring)						
28. Collecting (rocks, plants, mushrooms, berries, etc.)						
29. Outdoor scenic photography						
30. Rock climbing						
31. Sledding (snow)						
32. Other						

SECTION 2

This section of the survey concerns your attitudes toward the environment and politics. Please circle the number that most closely represents your view.

- Q-5** Listed below are statements about the relationship between humans and the environment. For each, please indicate your level of agreement.

	Strongly disagree	Mildly disagree	Neutral	Mildly agree	Strongly agree
a. The balance of nature is very delicate and easily upset by human activities.	1	2	3	4	5
b. Humans have the right to modify the natural environment to suit their needs.	1	2	3	4	5
c. We are approaching the limit of people the earth can support.	1	2	3	4	5
d. The so-called "ecological crisis" facing humankind has been greatly exaggerated.	1	2	3	4	5
e. Plants and animals have as much right as humans to exist.	1	2	3	4	5
f. Humans were meant to rule over the rest of nature	1	2	3	4	5

- Q-6** With regard to your *active involvement in community affairs*, please check each of the following that applied to you over the course of the *past year*:

- Attended a public meeting on town or school affairs
- Served as an officer of some club or organization
- Served on a committee for some local organization
- Signed a petition
- Wrote a letter to a legislator
- Worked on a community project

Q-7 In regard to *following public affairs* and being engaged in civic activities, please indicate which of the following are typical of your activity. (Please circle response)

- 1. Read newspaper daily Yes / No
- 2. Do volunteer work in the community Yes / No
- 3. Am interested in politics Yes / No
- 4. Attend church regularly (once a month or more) Yes / No

Q-8 In the area of *general outlook on life*, please place yourself on the following five-point scale

Most people can be trusted **1** **2** **3** **4** **5** Most people cannot be trusted

SECTION 3

This section seeks general information on the size of the places where you have lived, and live now.

Q-9	Size of Place of Residence					
Please indicate with an X...	Farm/Ranch	Rural area, but not a farm	Less than 10,000 people	10,000-100,000 people	100,000-250,000 people	More than 250,000 people
The type of "place" your parents lived in when you were born?						
The size of the place						

you <i>currently live in?</i>						
During your childhood (age 18 or younger), the size of place you lived in <i>for the majority of the time</i>						
Since the age of 18, the size of place you have lived in <i>for the majority of the time?</i>						

SECTION 4

We now have a few concluding questions to check to see if our survey is representative of all types of people. We also have included a couple of questions concerning politics. Please remember that all answers are completely confidential.

Q-10 What is your current age in years? _____

Q-11 Please indicate your Gender: 1. Female 2. Male

Q-12 What level of education have you completed?

- | | |
|---------------------------------|---------------------|
| 1. Grade school | 5. Some college |
| 2. Middle or junior high school | 6. College graduate |
| 3. High school | 7. Graduate school |
| 4. Vocational school | 8. Other _____ |

Q-13 Which of the following best describes your current work situation?

- | | |
|----------------------------------|----------------|
| 1. Employed full time | 5. Retired |
| 2. Employed part time | 6. Student |
| 3. Not employed outside the home | 7. Other _____ |
| 4. Unemployed | |

Q-14 If you answered that you currently live on a farm/ranch in Q-9, are you a?

