

USING RECREATION SPECIALIZATION AND SENSE OF PLACE  
TO MEASURE RECREATIONAL USERS' MOTIVATIONS  
WITHIN BOULDER'S OPEN SPACE AND MOUNTAIN PARKS

by

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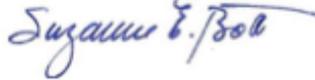
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As members of the Dissertation Committee, we certify that we have read the dissertation prepared by Garrett Ryan Smith entitled *Using Recreation Specialization and Sense of Place to Measure Recreational Users' Motivations Within Boulder's Open Space and Mountain Parks* and recommend that it be accepted as fulfilling the dissertation requirement for the Degree of Doctor of Philosophy.



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“Sometimes the light's all shinin' on me,  
Other times I can barely see.  
Lately it occurs to me what a long, strange trip it's been.”

— *Truckin* Grateful Dead

Indeed, what a long strange trip graduate school has been and there are many who have accompanied me on this journey that deserve to be thanked. First, I would like to thank my advisor, Dr. Randy Gimblett, a true kindred spirit, guiding light, and advocate for the kind of research I have been pursuing over the past five years. A chance meeting between my dogs and his wife on the trails along Marshall Saddle on Mount Lemmon high above Tucson evolved into my interest in recreational research, ultimately leading to this dissertation.

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## **Executive Summary**

The purpose of this study was to explore place attachment, recreation specialization, and motivations between different recreation groups who recreate on landscapes that are managed by the Open Space and Mountain Parks (OSMP) department in Boulder, Colorado. This study utilized on-site, self-administered surveys to measure recreationalists' levels of place attachment and recreation specialization as well as their motivations to recreate. Place attachment, recreation specialization, and Recreation Experience Preference (motivation) are well established frameworks utilized in the recreation literature and were used to explore the differences of recreation groups, to explore the difference between City of Boulder and Non-Boulder residents, and to understand the association between recreation groups, motivations, place attachment, and recreation specialization.

A total of  $n=989$  self-administered, on-site survey instruments were administered and collected at nine multi-use OSMP trailheads. Results show that as levels of recreation specialization increase so too does place attachment. Trail runners' place attachment was different than hikers, mountain bikers, and other recreation groups while hikers' recreation specialization was different than mountain bikers, trail runners, and other recreation groups. City of Boulder residents differed from Non-Boulder residents in terms of place attachment but not recreation specialization. Finally, the top two motivations for all recreation groups was "For physical fitness" and "To enjoy nature". With the third highest motivation being "To be close to nature" for hikers, trail runners, and mountain bikers and "For relaxation" for other recreation groups. Recreation activity and gender were significant predictors for choosing level of control or catharsis over the physical setting motivational dimension and that recreation specialization

was a significant predictor for choosing level of control over the physical setting motivational dimension.

Results from this study can be used by OSMP managers to:

- Recognize that OSMP lands, though managed by a local management agency, are becoming a regional asset utilized by those in the surrounding communities providing support for a more enforceable fee-based system for those coming from outside of Boulder. Managers should also recognize that Non-Boulder residents in these communities may view themselves as stakeholder groups that need to be included in the planning and management processes
- Build more support for the acquisition of more OSMP lands by highlighting the perceived public health benefits the community is realizing from having access to lands managed by the agency. Physical setting was the highest dimension of motivation and respondents indicated that “To enjoy nature” ( $n = 199$ ) and “To be close to nature” ( $n = 173$ ) were two of the most frequent motivation variables.
- Manage landscapes to provide a diversity of experiences with an understanding that recreation groups are not a single entity, but instead are distinct groups that have different levels of place attachment and recreation specialization as well as different motivations to pursue their recreational pursuits.

Recreational activities are becoming more diverse across publicly managed landscapes.

While results from this study can only be generalized to those recreational users that utilize the sampled trailheads other public land management agencies can employ the same framework to gain a greater understanding of the diverse array of recreationalists that are seeking out publicly managed landscapes for their chosen recreational activities.

## **Abstract**

This study expands upon the research that has been conducted in regard to place attachment, recreation specialization, and motivation between recreation groups. Onsite surveys (n=989) were collected at nine multi-use trailheads managed by the City of Boulder's Open Space and Mountain Parks (OSMP) department. A Kruskal-Wallis test followed by a Tukey Honest Significant Difference Test (Tukey HSD) was used to identify differences in place attachment and recreation specialization between four recreation groups. Results showed that trail runners showed a statistically significant difference in place attachment when compared to hikers, mountain bikers, and other recreation groups. Hikers showed a statistically significant difference in recreation specialization when compared to mountain bikers, trail runners, and other recreation groups. One-way ANOVA tests showed that City of Boulder and Non-Boulder residents showed a statistically significant difference in place attachment but not recreation specialization. The top two motivations for all recreation groups was "For physical fitness" and "To enjoy nature". With the third highest motivation being "To be close to nature" for hikers, trail runners, and mountain bikers and "For relaxation" for other recreation groups. A Multinomial Logistic Regression found that recreation activity and gender were significant predictors for choosing level of control or catharsis over the physical setting motivational dimension. Additionally, the multinomial model showed that recreation specialization was a significant predictor for choosing level of control over the physical setting motivational dimension. This research can be used to inform OSMP land managers on how to develop management plans that incorporate a better understanding of the differences between recreation groups and their motivations to recreation on OSMP landscapes.

## Chapter 1. General Introduction

### 1.1 Personal Reasoning

It is 2:00 am and I find myself running through the Bighorn Mountains outside of Sheirdan, Wyoming in a rainstorm that started around seven hours ago and will not let up for another five hours. I am 65 miles into the Bighorn Mountain Wild and Scenic 100-mile trail run and the trails are fluctuating between flowing water, slippery mud, or a combination of the two. Conditions and experiences like these challenge my mental and physical capacities, begging the question of why I put myself through these endurance runs, and also serve as the impetus for this dissertation.

During my initial graduate studies, I was concerned with wildlife habitat suitability and corridor modeling, exploring how wildlife utilize and traverse the landscapes for which they depend in order to both survive and reproduce. Habitat suitability, for any given species, is determined by the combination of abiotic environmental characteristics of the site. Variables related to different characteristics of the environment and landscape such as climate, human land use, vegetation, elevation, slope, aspect, proximity to food and water sources are quantified and spatially overlaid to locate patches of habitat that are suitable for the target species on a given landscape (Guisan, Thuiller and Zimmerman 2017). Corridor modeling relies on the same environmental and landscape characteristics to turn a landscape into a cost surface, in which every cell on a map has an affiliated cost to the species if it were to traverse that particular cell. Within the model the species will travel the least cost path, or corridor, between the previously established habitat patches. Distribution and movement between these habitat patches serve many biological purposes including but not limited to access to seasonal food sources, increases

in genetic diversity among a population, and to maximize reproduction success (Kauffman, Meacham, Sawyer, Rudd, and Ostlind 2018).

Both habitat suitability and corridor modeling make it apparent that wildlife species are heavily reliant on their interactions with the natural environment for their survival and sometimes these species must traverse long distances across the landscape in order to fulfill their bio-physical needs. This got me, as an ultra-marathon trail runner, to think more about what reasons myself and others like me who participate in outdoor recreational activities have for utilizing and traversing natural landscapes.

The other race participants in the Bighorn Wild and Scenic 100 and I did not need to be running through a torrential rain storm in the Bighorn Mountains in order to fulfill our biophysical needs. We, in our everyday lives, were not dependent on traversing these trails for survival individually or as a species. Most of us reside in the modern Western world and we have ample and far more convenient ways to access food and water than by running between aid stations in the middle of a mountain range in Wyoming for 100 miles. Similarly, we do not need to travel long distances from our homes in order to successfully reproduce with others in order to keep the human species going. While endurance events are breeding grounds for both masculine and feminine competition, this competition does not lead to hierarchal sorting or sexual procreation among the race participants like one would see in a migrating herd of wildlife species. What then was the motivation or reasoning behind being out here? Do we sign up for these endurance events or participate in nature-based recreation for the proverbial 100-mile belt buckle, for a t-shirt, to have a life altering experience, for competition, to obtain legitimacy within a small sub-group of recreationalists, to push ourselves farther mentally and physically than we thought possible, or to develop a more fundamental and intimate connection with

nature? These questions have existed in the back of my mind over a multitude of similar experiences both with others in ultra-marathon races and with myself in training and unstructured adventures. They have also led me to switch from studying wildlife species that move across natural landscapes to asking the question of why humans move across these same landscapes.

In studying wildlife movement there is a lot of inference about why a species would move across a landscape based on repeated observations and Bayesian knowledge. What is fascinating about humans is that we can actually ask them why they do what they do. I believe that this more qualitative knowledge of why humans participate in their chosen recreation activity can be utilized by land managers to better manage public landscapes. There is a plethora of information available related to the who, what, when, and where with this study I seek to square the circle and give land managers a means to exploring the why.

## **1.2 Dissertation Introduction**

Since the mid 1800s an influx of settlers and their land-use decisions began to modify existing landscapes throughout the western United States. While these land-use decisions generally revolved around resource extraction and agricultural productivity, contemporary land-use decisions in these same locations revolve around balancing rapid population growth and preservation of natural spaces. Population growth and increasing urbanization have put pressure on open spaces and publicly managed landscapes as more and more people seek these places for recreation. Increases in the numbers of people whom turn to publicly managed open spaces for recreation precipitates the need for community leaders, residents, and public land managers to make concerted efforts to manage these spaces by balancing ecological, scientific, cultural, historic, and aesthetics with development for recreation (Jackson 1987).

Participation in outdoor recreation has become an important part of many people's lives and identities necessitating the need for continued research. In 2016 a total of 144.4 million individuals in the United States, equating to roughly 48.8 percent of the total population, participated in an outdoor activity at least once, an increase of 0.4 percent or an additional two million outdoor participants from 2015 (Outdoor Industry Foundation 2017). Shaw (1999) pointed out that the popularity of recreation, as measured by the percentage of the population who participate, increased from the early 1970's to the late 1990's and the Outdoor Industry Foundation's report supplements his findings from previous decades. Tarrant and Cordell (1999) note that both short- and long-term trends in participation indicated that the popularity of recreation has continued to increase across most segments of the population. Adding to challenges presented by the increases in popularity and participation rates of nature-based recreation is the recognition that landscapes are not viewed by recreationalists as static entities and recreation pursuits are not simply a physical activity. Instead, both the landscape and the recreation activity are embedded with meaning that varies by individual. Kaltenborn and Williams (2002) argue that meanings of natural landscapes and the choice to participate in recreational activities are fluid and are continually under assessment by those that utilize them for recreation. Beard and Ragheb (1983) noted that recreation, being a voluntary activity, make recreationalists among the most interesting individuals to study because there is not an obvious force that compels them to participate in their chosen recreation activity. Therefore, managers have to understand that there is a complexity to the human-environment relationship with a recognition that different individuals assign unique meanings to their activity and the landscapes as well as their decisions to participate in their chosen recreation activity in the first place.

Increasing numbers of recreationalists, increasing diversity in recreational pursuits, the fluidity of meaning of these recreational pursuits, and differing motivations to participate in outdoor recreation on a limited supply of publicly managed lands are providing new challenges to managers that necessitate the need for new research frameworks to better inform new management approaches. It is rare for any publicly managed landscapes to be managed for one recreational activity and managers have to be aware that any management decisions, in order to be successful, should balance expectations of a wide array of recreational groups with the characteristics of the land itself (Galloway 2012). Two of the key questions that managers must address are how do landscapes and recreational activities become embedded with meaning and what those implications imply for future management decisions?

Traditionally research in outdoor recreation was descriptive in nature focusing on the number of recreation participants, activities in which they participated, and their socio-demographic makeup (Borrie and Birzell 2001). This dissertation proposes a new theoretical framework to understand the motivations and experiences that diverse recreational groups have within lands managed by Boulder's Open Space and Mountain Parks (OSMP) department. Boulder, Colorado is often considered to be one of the most desirable places to live, one of the healthiest cities, and ranks among one of the top adventure cities in the United States. This list of accolades is predicated on Boulder's natural setting and the attitude of the city's residents on how they should exist within and interact with this natural setting. Boulder's OSMP department, with the help of the city's residents, have been able to acquire, protect, and manage over 45,000 acres of natural landscape that offer Boulder residents ample opportunities for recreational activities. Lands managed by OSMP offer the perfect setting to apply a new recreational framework and study a diverse group of recreationalists in the same regional setting. This study

specifically seeks to understand recreationalists not simply as a homogenous group but instead as a heterogeneous makeup of recreational pursuits whose individuals have different levels of place attachment and recreation specialization between their chosen activities that may contribute to their motivations to partake in their chosen recreational activity. As the population of Boulder and the popularity of outdoor recreational pursuits on OSMP lands continues to grow this research will help OSMP staff better manage the unique nature of the natural landscape and the recreational opportunities that are provided by their department.

Place attachment, recreation specialization, and Recreation Experience Preferences (REP) frameworks (from now on referred to as recreation motivation) have been widely applied in recreation research as a means to understand individuals or recreation groups. Place attachment is a multi-faceted construct that defines either an individual's relationships with their surroundings or alternatively their emotional ties they have to outdoor settings (Hammond and Judy 1996). Recreation specialization was originally defined by Bryan (1977) as the "continuum of behavior from the general to the particular, reflected by the equipment and skills used in the sport and activity preferences" (p.29). At one end of the recreation specialization continuum there are individuals that are highly committed to their chosen recreation activity while at the other end participants have a low commitment to their chosen recreation activity (Kim and Oh 2013). Finally, motivations are the underlying forces or needs that elicit and direct certain behaviors (Iso-Ahola 1999). Individuals engage in certain recreational activities within specific settings to satisfy a group of psychological outcomes that can be known, expected, or valued (Manning 2011). All three of these concepts, if employed by researchers or recreation managers, stipulate that recreation pursuits are not simply a physical activity but an individual experience

that takes place within a natural setting that entails psychological, social, and physiological outcomes (Budruk and Stains 2013).

Previous studies on recreation have generally focused on describing and measuring place attachment, recreation specialization, and motivation as distinct concepts among one recreation group in one location. More recently studies have begun to explore the development of these concepts between recreation groups and how these concepts relate to one another. This dissertation aims to expand upon these previous studies by asking the following questions:

1. Are levels of place attachment and recreation specialization different depending on recreational activity?
2. Do City of Boulder residents have different levels of place attachment and recreation specialization when compared to Non-Boulder residents?
3. What is the relationship between place attachment and recreation specialization on motivation and do these relationships vary by group?

As participation in outdoor activities continues to increase land managers need to be aware of identifying what motivates users to seek out and recreate on the landscapes they manage.

Answers to these questions will have immediate utility to managers working on OSMP lands by enabling them to gain a broader understanding of the individual recreation groups that utilize their landscape and their underlying motivations for recreation.

### **1.3 Dissertation Organization**

This dissertation is organized into seven chapters. It includes a general introduction (Chapter 1); a chapter devoted to providing the historical and contemporary history of Boulder's land preservation and how this has led to Boulder becoming a city known for outdoor recreation (Chapter 2); a chapter devoted to the research design (Chapter 3); two chapters that compare

place attachment and recreation specialization between recreation groups and City of Boulder and Non-Boulder residents (Chapter 3 and 4); a chapter that compares recreational motivations between different recreation groups (Chapter 6); and a final results and discussion chapter (Chapter 7).

As a whole, this dissertation aims to provide land managers with a framework to better understand why people seek out the landscapes that they manage for their recreational pursuits. Through the application of this framework I hope to both inform and guide future studies that can more fully establish the motivations for why people belonging to different recreation groups participate in outdoor recreation and how this information can be used by land managers to implement management plans that will not negatively impact these motivations. I aim to provide Boulder's OSMP department with results that will contribute to their future management plans while also filling a gap in the outdoor recreation literature.

## **Chapter 2. Boulder Colorado; Land Preservation and Recreation**

### **2.1 Boulder, Colorado's History of Open Space Preservation**

Boulder, Colorado is located thirty-five miles northwest of Denver and is framed by the dramatic mountain faces of the Flatirons and surrounded by ample amounts of open space areas for recreation. The amount of the landscape that has been untouched by development is a result of Boulder resident's long held beliefs and dedication to preserving open space and mountain parks that began over 100 years ago.

Boulder Valley has been inhabited by humans for over 14,000 years. Early indigenous people developed connections and a culture that were formed on the basis of the land's diverse natural features which included rolling grasslands, mountain foothills, riparian areas, and unique geologic features (Hickcox 2007). Like so many indigenous groups in the Western United States, discovery of gold in and around the area in the mid 1800s led to an influx of settlers that displaced indigenous communities and started to change the natural landscape into a more human dominated one through the establishment of the city, agriculture, mining, and transportation. In 1898, recognizing that development was placing a burden on the natural landscape, the City of Boulder purchased Batcheleder Ranch at the base of the Flatirons creating the Colorado Chautauqua cultural center, the first and only of its kind west of the Mississippi River. This purchase was the first time that residents of Boulder began investing and supporting the preservation of natural places (Reilly-McNellan 1995).

Over the next 30 years, from this initial purchase of Batcheleder Ranch, the city acquired an additional 5,000 acres of public land, much of it with mountainous backdrops of Flagstaff Mountain and the Flatirons, forming the Boulder Mountain Parks in the process (Reilly-McNellan 1995). During this same time period, Frederick Law Olmsted Jr. was commissioned to

develop a report for the city focusing specifically on the location of parks, waterways, irrigation, sewage, and streets. One of the key messages emanating from Olmsted's commissioned plan was that city officials should be cautious not to spoil the bounties that nature had afforded the city to that point (Olmsted 1910).

As with much of the nation Boulder's growth was slowed by the Great Depression of the 1930s however, they were able to benefit greatly from the work of the Civilian Conservation Corps (CCC). Projects in Boulder completed by the CCC included the building of trails, shelters, picnic tables, fireplaces and an amphitheater on Flagstaff Mountain adding recreational amenities to these preserved places. During this same time period, because of its proximate location to Rocky Mountain National Park, the National Park Service (NPS) developed a Master Plan for Boulder's Mountain Parks system. The framework for this plan drew heavily from Olmsted's initial report and initiated projects that would provide more connections between the City of Boulder and the surrounding natural community (Reilly-McNellan 1995).

At the end of World War II Boulder witnessed its largest period of growth in terms population. With a recognition that an increase in population brought greater pressures to the natural environment the city of Boulder residents passed the "Blue Line" city charter amendment. At the western edge of the city's mountainous backdrop the "Blue Line" amendment banned the provision of water and sewage services by the city to any development above 5,780 feet. The purpose of this amendment was to ensure that development would not infringe on the mountains that many in the community recognized as a dramatic and iconic backdrop for the city (Plantico 2008).

Pressures from population growth continued to encourage Boulder residents to become ever-more progressive in their support for protecting natural places in and around the city. In

1967 Boulder became the first U.S. city to pass a sales tax where funds would specifically be used to purchase and maintain natural lands. Four years later, in 1971, the city's voters approved another first of its kind for a U.S. city, a charter amendment allowing the city to issue bonds in order to acquire open space. From 1960 to 1978 open space land acquired by the city increased from 5,000 to around 15,000 acres slowly forming a natural greenbelt stretching around the city's boundaries (Zaslowsky 1995).

It was not just the city's residents that recognized the need to protect natural places. In 1973 the Boulder City Council established the Open Space Board of Trustees (OSBT) tasked with setting policies and priorities for the acquisition and management of the city's open space land. OSBT also developed an open space program plan which defined open space purposes (Reilly-McNellan 1995).

From 1978 to 1999 the open space acquired by the city increased by 20,000 acres (City of Boulder 2001) with the city's residents continually supporting the extension of the open space sales tax first passed in 1967 (Reilly-McNellan 1995). Continued support for acquisition and maintenance of open space land has signaled that past and current residents of Boulder hold the preservation of open spaces as one of their central values. It has allowed the city to maintain a unique identity that is tied to the landscape while also maintaining a buffer between itself and surrounding communities that have not adopted the same attitude towards open space preservation. While the City of Boulder is only 25.8 square miles, it is surrounded by 71 square miles of protected open space managed by the city to better control the growth of development that is overwhelming neighboring communities (City of Boulder 2001).

Currently OSMP manages over 45,000 acres of open space balancing nature preservation, agriculture, passive recreation, and scenic beauty (City of Boulder 2013). In recent

years expansion proposals and land acquisitions have shifted from expanding the public spaces outward to an emphasis on acquiring lands that will connect or fill in missing pieces or gaps of the open space system.

## **2.2 Boulder as a Setting for Recreational Research**

Over the last couple of decades, as a result of the past and continued support of the preservation and maintenance of open space, Boulder has accumulated a number of accolades. It is consistently ranked as one of the most desirable places to live, one of the healthiest cities, and ranks among one of the top adventure cities in the United States. This list of accolades is predicated on Boulder's natural setting and the attitude of the city's residents on how they should exist within and interact with this natural setting. Boulder's OSMP department, with the help of the city's residents, have been able to acquire, protect, and manage natural areas that offer Boulder residents ample opportunities for passive recreational activities.

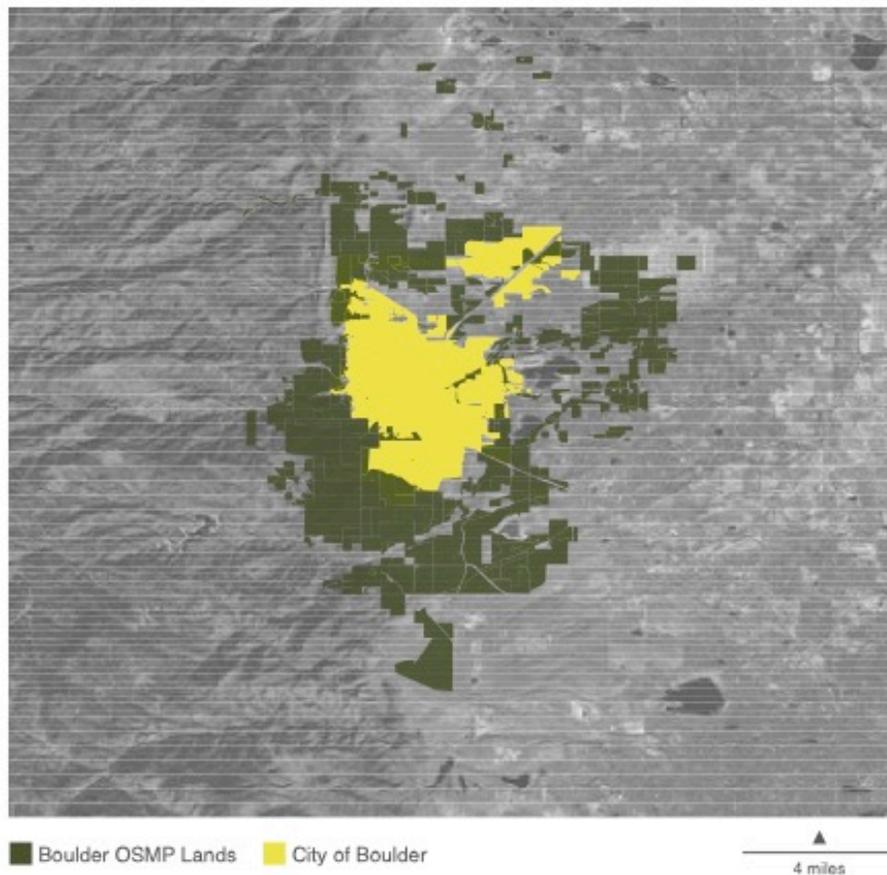
In Boulder outdoor recreation is not a hobby but rather a way of life for many of the residents of the city. Over the years it has become known as the endurance junkies' paradise. Small enough to feel like a cloistered island of like-minded fitness based and progressive individuals, but also large enough where all the trappings of modern life are easily accessible. There is ample opportunity for trail running, hiking, mountain biking and climbing out of many of the residence's back doors and many of the most popular recreational areas are easily accessible from the most popular hang-out spots in town. Furthermore, Boulder is within close proximity to the Rocky Mountains and the Continental Divide making it just as appealing in the winter as it is in the summer, spring, and fall. As such lands managed by OSMP offers the perfect setting to apply a new recreational framework and study a diverse group of

recreationalists and their motivations and experiences as they relate to their chosen recreational pursuit.

## Chapter 3: Research Design and Summary Statistics

### 3.1 Study Sites

Boulder’s OSMP manages over 45,000 acres of land which contain over 155 miles of developed and maintained trails within and around the City of Boulder (Figure 1). This study was conducted at nine OSMP trailheads (i.e., Bobolink, Boulder Valley Ranch, Doudy Draw, Eagle, Flatiron Vista, Four-Mile Creek, Greenbelt Plateau, Marshall Mesa, and Tellar Farms-South) that allowed for multiple recreational use types (Figure 2).



*Figure 1. Map of OSMP managed lands and the City of Boulder. Data obtained from City of Boulder Open Data Catalog (2019).*

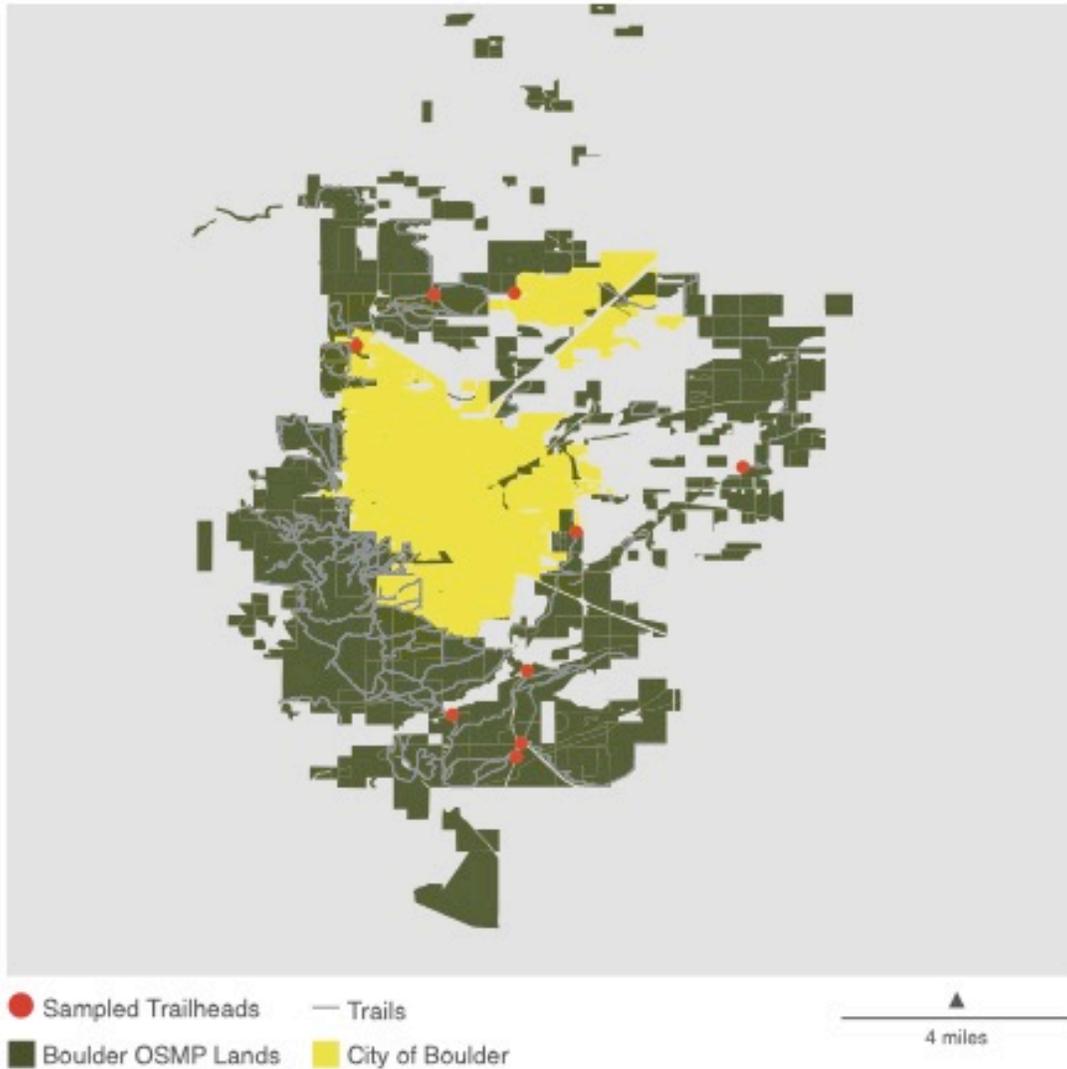


Figure 2. Map of OSMP sampled trailheads used during the study period. Data obtained from City of Boulder Open Data Catalog (2019).

### 3.2 Sampling Design

OSMP land managers helped to develop a three-stage cluster sampling procedure, using trailheads as the primary unit of analysis, for randomly selecting medium and high use trailhead locations (at least 25,000 annual visits), randomly assigning the selected trailhead with a day of the week (Monday through Sunday), and finally randomly assigning a morning (8:00 – 11:00

a.m.) or afternoon (4:00 – 7:00 pm) sampling timeframe. Data collection took place at the selected trailheads during four week-long periods from June through September 2017.

Surveys were distributed during two periods during the day, the morning from 8:00 a.m. – 11:00 a.m., and the afternoon from 4:00 p.m. – 7:00 p.m. A census sampling method at the trailheads was employed. If the trailhead had an obvious entry and exit point (i.e., a gate) recreationalists were contacted when leaving and not arriving at the trailhead with the idea that recreationalists attempting to attain a goal were less likely to fill out an onsite survey if it would block their attempt to attain this goal. Contacts at these locations took place after individuals finished their recreational activity. If the trailhead did not have an obvious entry and exit point, all attempts were made to contact each recreationalist whom passed the research table. If a visitor was not willing to participate in the study their gender and recreation activity they were participating in when passing by the research table were noted. The researcher also asked if the recreationalist was from the City of Boulder or not from the City of Boulder. These characteristics were subsequently used during data analysis to examine if there was any non-response bias between those that participated in the study and those that did not. It should be noted that since a census sampling method was used on the secondary units of analysis, individual recreationalists, there is the assumption that results from the study can only be generalized to the trailheads in the sample. Since the purpose of this study is to compare place attachment, recreation specialization, and motivations across activities it can be assumed that the sampling bias is normally distributed across all groups and therefore a census sampling approach is valid.

### 3.3 Methods

Data for this study were obtained from an onsite, self-administered survey distributed at the randomly selected OSMP multi-use trailheads. This four-page survey instrument consisted of seven questions related to respondent's sociodemographic characteristics, 14 questions related to place attachment, 20 questions related to recreation specialization, and one final question related to motivation (see Appendix). Sociodemographic questions were obtained from OSMP land managers in order to ensure consistency with their previous research efforts.

Place attachment questions were based primarily on Kyle, Graefe, and Manning's (2005) conceptualization that place attachment is a multi-dimensional construct consisting of place identity and place dependence. Questions on both place identity and place dependence were drawn from the initial exploratory work of place attachment in recreation by Williams and Roggenbuck (1989). Respondents rated items on a five-point Likert scale where 1 = "strongly disagree" and 5 = "strongly agree".

Recreation specialization questions were adapted from the Bricker and Kersetter (2000) survey used to study recreation specialization among whitewater recreationalists. Much like place attachment, recreation specialization is also conceived as a multidimensional construct containing four dimensions; level of experience, centrality to lifestyle, enduring involvement, and equipment and investment. Level of experience questions asked respondents how many years and how many times a month they participate in their chosen recreational activity. Centrality to lifestyle questions asked respondents to answer a series of yes or no questions. Finally, enduring involvement and equipment and investment questions asked respondents to rate items on a five-point Likert scale where 1 = "strongly disagree" and 5 = "strongly agree".

Motivations were selected from Driver, Tinsley, and Manfredi's (1991) study based on Kyle, Bricker, Graefe, and Wickham's (2004) claim that Driver's REP scales only capture several values associated with natural places and nature-based recreation. They suggest that motivation item selection, from the REP scale, should be chosen based on the researcher's knowledge of the recreation groups being studied and the context of the landscape. Of the 386 REP items, 19 were chosen that fall under six motivation domains (domains in motivation research are typically represented by two or more REP scale items); level of control, physical setting, catharsis, creativity, recognition, and challenge and risk. Respondents were asked to select and rank their three primary motivations for participating in their chosen recreation activity.

### 3.4 Descriptive Statistics

During the study period 2,673 individuals were approached at trailheads to participate in the study of that a total of  $n=989$  surveys were collected with a response rate of 37% (Table 1). Non-response bias was examined by comparing the characteristics gender and recreation activity of those that completed the survey with those that refused at the point of contact.

*Table 1. Sample demographics*

	n	%
Gender		
Male	445	45
Female	544	55
Age		
18-20	22	0.1
21-29	150	15.1
30-39	151	15.3
40-49	238	24.1
50-59	232	23.4
60 or older	196	19.8

Table 1. Continued

	n	%
<b>Education</b>		
Less than a high school degree	2	0.2
High school degree or equivalent	26	2.6
Some college but no degree	80	8.1
Associate Degree	34	3.4
Bachelor Degree	411	41.6
Graduate Degree	436	44.1
<b>Employment</b>		
Employed full-time	612	61.9
Employed part-time	172	17.4
Not employed, looking for work	28	2.8
Not employed, not looking for work	46	4.7
Retired	130	13.1
Disabled, not able to work	1	0.1
<b>Income</b>		
Less than \$10,000	40	4.0
\$10,000 to \$25,000	28	2.8
\$25,000 to \$55,000	128	12.9
\$55,000 to \$100,000	280	28.3
\$100,000 or more	513	51.9
<b>Ethnicity</b>		
White	914	92.4
Black or African American	5	0.5
American Indian or Alaskan Native	2	0.2
Asian	20	2.0
Native Hawaiian or Pacific Islander	0	0
Multiple Races	26	2.6
Other	22	2.2
<b>Residence</b>		
Boulder (within city limits)	428	43.3
Unincorporated Boulder County	113	11.4
Other City in Boulder County	26	2.6
Longmont	50	5.1
Louisville	57	5.8
Lafayette	67	6.8
Superior	27	2.7
Metro Denver	75	7.6
Other areas in Colorado	72	7.3
Out of State	69	7.0
Out of Country	5	0.5
<b>Recreation Activity</b>		
Hiking	467	47.2
Trail Running	260	26.3
Mountain Biking	217	21.9
Climbing	22	2.2
Horse Riding	8	0.8
Other	15	1.5

The majority of the sample were female (55%), white (92.4%), between the ages of 40 to 49 (24.1%), and from within Boulder’s city limits (43.3%). The sample was well educated with 85.7 percent of the participants having either a bachelor or graduate degree. A majority of the

sample was employed full-time (61.9%) and had combined household incomes of \$100,000 or more (51.9%). Hiking represented the largest recreation activity (47.2%) followed by trail running (26.3%) and mountain biking (21.9%). Because of the fact that climbing (2.2%), horse riding (0.8%), and other (1.5%) accounted for such a small part of the sample, it was decided to combine all three activities into an “others” category for subsequent analysis. Additionally, for further analysis, residence categories were collapsed into two categories, City of Boulder residents (43.1%) and Non-Boulder residents (56.9%) (Table 1).

Data from the onsite surveys were entered and stored into an initial database using Qualtrics software. If a survey had more than nine questions (20% of the total questions) not filled out the survey was determined to be incomplete and removed from the sample. A total of nine survey instruments were dropped from the analysis based on being incomplete. Data were analyzed using RStudio version 1.1.383 (RStudio 2018). Prior to the data analysis data were cleaned and screened for missing values. Missing values were replaced using the Multivariate Imputation by Chained Equations through the utilization of the *mice* R package (van Buuren and Groothuis-Oudshoorn 2011). The distribution of the original and imputed data to ensure that the imputed data were plausible values.

## Chapter 4: Place Attachment Variable

### 4.1 Place Attachment as a Concept

“Sense of place” is a multi-faceted construct that defines either an individual’s relationships with their surroundings or alternatively the emotional ties they have to outdoor settings (Hammond and Judy 1996). People gain meaning, belonging, and purpose to their lives through their personal attachments to places (Tuan 1980). Tuan (1977) defines place as a space that has been given meaning; “what begins as undifferentiated space becomes place as we get to know it better and endow it with value” (p. 6). Relph (1976) notes that place is not just simply the “where” of something but a place that embodies deep meaning. In addition, Nye (1996) infers that within this notion of place an individual may find the sublime that acts on one’s self of spirit. Certain places then hold significant meaning because of deep interactions that have affected deeper levels of the sub-consciousness encouraging an exploration of the physical world and inner reaches of one’s soul (Relph 1976). Embodiment of spiritual richness and significance gives the individual the sense that they are forming a deep connection to the land (Riley 1992).

Place attachment consists of at least two dimensions, place identity and place dependence (Williams, Anderson, McDonald, and Patterson 1995; Williams and Roggenbuck 1989). Place identity is more representative of the emotional and symbolic nature of person-place relationships. Proshanky, Fabian, and Kaminoff (1983) noted that place identity is a fundamental sub-concept of self-identity and they go on to suggest that it is a process that operates somewhere between the ideas of place and identity. However, Twigger-Ross and Uzzell (1996) proposed that place identity should not be a separate part of identity concerned with place since all aspects of identity have place-related associations to a greater or lesser extent. Place then should always be considered to have an active role in framing and constructing a person’s identity.

Place dependence as described by Shumaker and Taylor (1983) is the perceived strength of association between an individual and a specific place where strength of association is based on two things. First, is the degree to which the place satisfies the needs and goals of an individual. Second, is whether other places are available or present that would also meet the needs of the individual. It is more likely that a person will develop a place dependency on a particular location if it will meet all their goals (Shumaker and Taylor 1983) and provides for all their activity needs (Moore and Graefe 1994). In sum, place dependence is theorized by Moore and Graefe (1994) to be a function of “how well a setting facilitates users’ particular activities” (p.27).

#### **4.2 Place Attachment Applied to Recreation Groups**

One of the vexing questions in recreation research is how natural spaces come to embody a wide array of meanings and emotions to different recreation groups and subsequently what are the implications these meanings and emotion present to public land managers? It has been shown that different recreation groups assign different meanings to different places based on the identity of the group and these meanings are cultivated through social interactions that take place among individuals that partake in specific recreation activities (Eisenhauer et al. 2002). Recreational places therefore help to develop and maintain both self- and group-identities (Davenport and Anderson 2011).

Place attachment, in relation to recreation research, has also shown to be a key determinant in recreation behavior (Farnum, Hall, and Kruger 2005). Kaltenborn and Williams (2002) noted that land managers should seek an understanding of place attachment amongst recreational users in order to both attract recreationalists and to also provide them with a quality user experience. Place attachment is also a means to understand attitudinal loyalty and user re-

visitation since natural landscapes provide recreationalists with nurturing function that help elicit feelings of emotional pleasure, cognitive stimulation, psychological growth, self-expression, and commitment awareness (Tsai 2012). Furthermore, place attachment in the recreation research has been shown to be influenced by sociodemographic characteristics (Johnson 1998; Williams, Patterson, and Rogenbuck 1992), recreation activity involvement (Bricker and Kerstetter 2000; Eisenhauer, Krannich, and Blahna 2000; Kyle, Graefe, Manning, and Bacon 2003; Mowen, Graefe, and Virden 1998; Moore and Graefe 1994), experience preferences (Peyton 2003; Rosendahl 2002), and landscape type (Warzecha and Lime 2000; Williams et al. 1992; Kaltenborn and Bjerke 2002).

Most of the studies above rely on the idea outlined in the previous section that place is a multi-dimensional construct. Recreation researchers commonly apply a two-dimensional model based on place identity and place dependence as the dimensions used to measure the qualities attached to certain places. Place identity within a recreational activity is a complex pattern of conscious and unconscious ideals, beliefs, preferences, feelings, values, goals, and skills relevant to the environment where the activity is taking place (Proshansky et al 1983). There is no direct identity with the place in which the recreational activity is taking place, instead the individual begins to associate or define meaning to that place (Kyle, Mowen, and Tarrant 2004).

The other dimension, place dependence, is more of a functional attachment for the recreationalist. Instead of the conscious and unconscious reactions within an individual, place dependence is based on the place's perceived ability to facilitate the recreation experience. It is the functional utility of the place allowing recreational users to compare the quality of the current place where they are recreating to other comparable places they have recreated in the past

(Stokols 1981). Functional attributes of a place are centered around the location's physical and social characteristics.

### **4.3 Place Attachment Questions**

Place attachment questions were based primarily on Kyle, Graefe, and Manning's (2005) conceptualization that place attachment is a multi-dimensional construct consisting of place identity and place dependence. Five place identity and nine place dependence questions were used and were drawn from the initial exploratory work of place attachment in recreation by Williams and Roggenbuck (1989). Using a two-dimensional model to measure recreation groups' place attachment allows the researcher to assume that bonds that people have with a physical place has some distinct meaning rooted in that place (Williams and Vaske 2003).

Respondents were asked to rate the 14 place attachment questions on a five-point Likert scale where 1 = "strongly disagree" and 5 = "strongly agree". This Likert-based method has been used in other recreation studies on place attachment (Briker and Kersetter 2000; Budruk et al. 2010; Kyle et al. 2004). A multi-dimensional construct of place attachment, using place identity and place dependence as the two dimensions, was also chosen because it is the most common way to measure place attachment amongst recreationalists (Wynveen et al. 2017).

### **4.4 Place Attachment Results**

Cronbach's alpha showed that the factor loadings for the place attachment scale, consisting of 14 items, reached good internal reliability  $\alpha = 0.87$  amongst the entire sample (Table 2). Similarly, the Cronbach's alpha reached good internal reliability for place identity ( $\alpha = 0.87$ ) and place dependence ( $\alpha = 0.82$ ). Two loadings were dropped from the place dependence analysis because of alpha coefficient values that were larger than the entire place dependence and place attachment scales. These included "The time I spend on OSMP lands could just as easily

be spent somewhere else”  $\alpha = 0.89$  and “I would enjoy recreating in another publicly managed landscape just as much as I do on OSMP lands”  $\alpha = 0.88$ . Once the loadings were removed the place dependence scale’s reliability increased to  $\alpha = 0.86$  and the place attachment scale’s reliability increased to  $\alpha = 0.90$ .

Table 2. Cronbach’s alpha for the variables used to measure place attachment, place identity, and place dependence across the entire sample.

	$\alpha$ (if deleted)	$\alpha$	(r)
<b>Place Attachment original (final)<sup>1</sup></b>		0.87 (0.90)	0.39***
<b>Place Identity</b>		0.87 (0.87)	0.58***
OSMP lands mean a lot to me	0.87 (0.90)		
I identify strongly with OSMP lands	0.86 (0.90)		
I find a lot of my life is organized around OSMP lands	0.86 (0.90)		
OSMP lands are part of my identity	0.86 (0.89)		
Recreating on OSMP lands says a lot about who I am	0.86(0.89)		
<b>Place Dependence</b>		0.82 (0.86)	0.35***
The time I spend on OSMP lands could just as easily be spent somewhere else	0.89 (N/Ap)		
OSMP lands are the best place for the kind of recreation I like to do	0.86 (0.89)		
I enjoy recreating on OSMP lands more than any other place	0.86 (0.89)		
I get more satisfaction out of visiting OSMP lands than visiting any other publicly managed landscapes	0.86 (0.89)		
Recreating on OSMP lands is more important than recreating in any other place	0.86 (0.89)		
I would not substitute any other place for the type of recreation I do on OSMP lands	0.86 (0.89)		
No other publicly managed lands can compare to OSMP lands	0.86 (0.90)		
I would enjoy recreating in another publicly managed landscape just as much as I do on OSMP lands	0.88 (N/Ap)		
One of the reasons that I live where I live is because of OSMP lands	0.86 (0.90)		

\*\*\*Significant  $p \leq .001$ , \*\*Significant  $p \leq .01$ , \*Significant  $p \leq .05$

Note. Items measured using either a five-point scale (Strongly agree to strongly disagree)

<sup>1</sup> Final model eliminated two indicators (“The time I spend on OSMP lands could just as easily be spent somewhere else” and “I would enjoy recreating in another publicly managed landscape just as much as I do on OSMP lands”) based on the results of the initial reliability analysis.

Cronbach’s alpha was also determined for each recreation group individually to assess the reliability of the place attachment scales for all the recreational activities included in the sample (Table 3). Cronbach’s alpha for place attachment were nearly equal for all groups; trail running ( $\alpha = 0.86$ ), hiking ( $\alpha = 0.88$ ), mountain biking ( $\alpha = 0.86$ ), and others ( $\alpha = 0.87$ ). Place identity Cronbach’s alpha were similar amongst trail running ( $\alpha = 0.88$ ), hiking ( $\alpha = 0.87$ ), and

others ( $\alpha = 0.89$ ) though slightly lower for mountain biking ( $\alpha = 0.85$ ). Finally, Cronbach's alpha for place dependence were the same for trail running and others ( $\alpha = 0.80$ ) and slightly higher but the same for hiking and mountain biking ( $\alpha = 0.83$ ). Overall place attachment as a construct and place identity and place dependence as dimensions of the place attachment construct showed good internal reliability for each of the recreation groups.

Table 3. Comparison of Cronbach's alpha for place attachment, place identity, and place dependence between recreation groups.

	Recreation Group							
	Trail Running		Hiking		Mountain Biking		Others	
	$\alpha$	(r)	$\alpha$	(r)	$\alpha$	(r)	$\alpha$	(r)
Place Attachment	<b>0.86</b>	<b>0.33***</b>	<b>0.88</b>	<b>0.36***</b>	<b>0.86</b>	<b>0.31***</b>	<b>0.87</b>	<b>0.33***</b>
Place Identity	0.88		0.87		0.85		0.89	
Place Dependence	0.80		0.83		0.83		0.80	

\*\*\*Significant  $p \leq .001$ , \*\*Significant  $p \leq .01$ , \*Significant  $p \leq .05$

Note. Items measured using either a five-point scale (Strongly agree to strongly disagree)

An additive place attachment index was created and standardized into Z-scores. These scores were divided into three categories; high, medium, and low based on one standard deviation from the median (Table 4). A Kruskal-Wallis test showed that there was a statistically significant difference amongst at least one of the recreation groups and their associated place attachment index scores ( $\chi^2 = 23.41$ ,  $df=3$ ,  $p<0.001$ ). To identify the recreation groups that differed from one another a post hoc Tukey Honesty Significant Difference (Tukey HSD) multiple comparison test was employed. The post hoc test identified that trail runners had the highest mean place attachment index score ( $M = 2.01$ ). Trail runners were also significantly different from hikers, mountain bikers, and other recreation groups in regard to the associated place attachment index scores (Table 5). A Mann-Whitney  $U$ -test was performed to compare median values of the questions used to compile the place attachment index and in order to gain a

more detailed understanding of the differences between trail runners and hikers, mountain bikers, and other recreation groups (Table 6).

Table 4. Number and percentage of place attachment levels in each recreation group.

Recreation Group	Place Attachment Levels					
	High		Medium		Low	
	n	%	n	%	n	%
Trail Running	29	11.2	203	78.1	28	10.8
Mountain Biking	14	6.5	162	74.7	41	18.9
Hiking	47	10.1	331	70.9	89	19.1
Others	3	6.7	34	75.6	3	6.7

*Note.* An additive place attachment index was created and standardized into Z-scores. These scores were divided into three categories; high, medium, and low based on one standard deviation from the median.

Table 5. Differences in mean place attachment index scores by recreation group.

Place Attachment Index	Recreation Group							
	Trail Running		Trail Running		Others		Hiking	
	Mean	Group	Mean	Group	Mean	Group	Mean	Group
	<b>2.01</b>	<b>a</b>	<b>-0.46</b>	<b>b</b>	<b>-1.12</b>	<b>b</b>	<b>-1.18</b>	<b>b</b>

Values with different subscripts are significantly different at the 0.05 level based on a Tukey HSD post hoc test.

Table 6. Differences in median place attachment variables and place attachment by recreation group.

	Recreation Group							
	Trail Running		Hiking		Mountain Biking		Others	
	Median	SD	Median	SD	Median	SD	Median	SD
Place Attachment	4.17	8.56	0.17***	9.48	-0.82	8.33	-0.83*	8.80
OSMP lands mean a lot to me	5	0.61	5	0.71	5	0.82	5	0.82
I identify strongly with OSMP lands	5	0.79	5	0.85	5	0.86	5	1.11
I find a lot of my life is organized around OSMP lands	4	1.01	4***	1.10	4**	0.94	4	1.04
OSMP lands are part of my identity	4	1.04	4*	1.12	4***	1.04	4	1.48
Recreating on OSMP lands says a lot about who I am	4	0.98	4**	1.10	4**	1.06	4	1.01
The time I spend on OSMP lands could just as easily be spent somewhere else	4	1.30	4	1.34	4	1.20	4**	1.18
OSMP lands are the best place for the kind of recreation I like to do	5	0.89	4***	0.95	4***	0.96	4	1.04
I enjoy recreating on OSMP lands more than any other place	4	0.98	4***	1.10	3***	0.99	4*	1.16

Table 6. Continued

	Recreation Group							
	Trail Running		Hiking		Mountain Biking		Others	
	Median	SD	Median	SD	Median	SD	Median	SD
I get more satisfaction out of visiting OSMP lands than visiting any other publicly managed landscapes	4	1.05	3*	1.10	3***	0.97	3**	0.95
Recreating on OSMP lands is more important than recreating in any other place	3	1.06	3**	1.11	3**	0.95	3	0.95
I would not substitute any other place for the type of recreation I do on OSMP lands	3	1.15	3	1.16	3**	1.06	3	1.17
No other publicly managed lands can compare to OSMP lands	3	1.09	3	1.11	3	1.11	3	1.12
I would enjoy recreating in another publicly managed landscape just as much as I do on OSMP lands	3	1.05	2	1.03	2**	0.95	2	0.90
One of the reasons that I live where I live is because of OSMP lands	4	1.14	4**	1.19	4	1.07	4	1.09

\*\*\*Significant  $p \leq .001$ , \*\*Significant  $p \leq .01$ , \*Significant  $p \leq .05$

A Kruskal-Wallis test showed that there was a statistically significant difference between recreation groups and place attachment index. Note. Items measured using either a five-point scale (Strongly agree to strongly disagree)

Cronbach's alpha showed that the factor loadings for the place attachment scale, consisting of 14 items, reached good internal reliability and was the same for City of Boulder and Non-Boulder residents ( $\alpha = 0.87$ ) (Table 7). Similarly, the Cronbach's alpha reached good internal reliability for both place identity and place dependence. Place identity Cronbach's alpha was higher for City of Boulder residents ( $\alpha = 0.88$ ) than Non-Boulder residents ( $\alpha = 0.85$ ). However, place dependence Cronbach's alpha was slightly higher for Non-Boulder residents ( $\alpha = 0.83$ ) than City of Boulder residents ( $\alpha = 0.81$ ).

Table 7. Comparison of Cronbach's alpha for place attachment, place identity, and place dependence between City of Boulder and Non-Boulder residents.

	Residence			
	City of Boulder		Non-Boulder	
	$\alpha$	(r)	$\alpha$	(r)
<b>Place Attachment</b>	<b>0.87</b>	<b>0.34***</b>	<b>0.87</b>	<b>0.34***</b>
Place Identity	0.88		0.85	
Place Dependence	0.81		0.83	

\*\*\*Significant  $p \leq .001$ , \*\*Significant  $p \leq .01$ , \*Significant  $p \leq .05$

Note. Items measured using either a five-point scale (Strongly agree to strongly disagree) and a binary scale (yes or no)

An additive place attachment index was created and standardized into Z-scores. These scores were divided into three categories; high, medium, and low based on one standard deviation from the median (Table 8). Boulder residents had a higher mean place attachment index score ( $M=1.23$ ) than Non-Boulder residents ( $M=-0.94$ ). For a comparison of the place attachment index scores between City of Boulder and Non-Boulder residents a one-way ANOVA test showed that there was a statistically significant difference in relation to place attachment index scores between the two groups (ANOVA:  $F=14.2$ ,  $d.f=1$ ,  $p<0.001$ ). A Mann-Whitney *U*-test was performed to compare median values of the questions used to compile the place attachment index and in order to gain a more detailed understanding of the differences between City of Boulder and Non-Boulder residents (Table 9).

Table 8. Number and percentage of place attachment levels based on residence.

Residence	Place Attachment Levels					
	High		Medium		Low	
	n	%	n	%	n	%
City of Boulder	45	10.5	334	78.0	49	11.4
Non-Boulder	48	8.6	396	70.6	117	20.9

Note. An additive place attachment index was created and standardized into Z-scores. These scores were divided into three categories; high, medium, and low based on one standard deviation from the median.

Table 9. Differences in median place attachment variables and place attachment, place identity, and place dependence between City of Boulder and Non-Boulder residents.

Variables	City of Boulder		Non-Boulder	
	median	SD	median	SD
Place Attachment	2.17	9.00	-0.83***	8.96
OSMP lands mean a lot to me	5	0.78	5*	0.66
I identify strongly with OSMP lands	5	0.87	5**	0.83
I find a lot of my life is organized around OSMP lands	4	1.04	4***	1.04
OSMP lands are part of my identity	4	1.11	4**	1.06
Recreating on OSMP lands says a lot about who I am	4	1.07	4**	1.05
The time I spend on OSMP lands could just as easily be spent somewhere else	4	1.33	4	1.26
OSMP lands are the best place for the kind of recreation I like to do	4	1.01	4	0.91
I enjoy recreating on OSMP lands more than any other place	4	1.03	4*	1.07
I get more satisfaction out of visiting OSMP lands than visiting any other publicly managed landscapes	3	1.07	3	1.05
Recreating on OSMP lands is more important than recreating in any other place	3	1.04	3***	1.07
I would not substitute any other place for the type of recreation I do on OSMP lands	3	1.11	3**	1.15
No other publicly managed lands can compare to OSMP lands	3	1.07	3*	1.13
I would enjoy recreating in another publicly managed landscape just as much as I do on OSMP lands	2	1.04	2**	0.99
One of the reasons that I live where I live is because of OSMP lands	5	1.03	4***	1.19

\*\*\*Significant  $p \leq .001$ , \*\*Significant  $p \leq .01$ , \*Significant  $p \leq .05$

Note. Items measured using either a five-point scale (Strongly agree to strongly disagree) and a binary scale (yes or no)

## **Chapter 5: Recreation Specialization Variable**

### **5.1 Recreation Specialization as a Concept**

Recreation specialization was first conceptualized by Bryan (1979) as “a continuum of behavior from the general to the particular, reflected by equipment, and skills used in the sport and activity setting preferences” (p. 29). Recreation specialization is also used to examine the differences between segments of recreationalists within the same recreational activity (Scott, Ditton, Stoll, and Eubanks 2005). By understanding recreation specialization Bryan (1979) laid out a process for gaining a better understanding of the attitudes and behaviors associated with particular recreation groups. Two main theories of recreation specialization exist; the first has to do with a conceptual continuum where recreationalists can be segmented into specific groups that are representative of their specific behaviors, attitudes, and preferences. The second theory has to do with progression in that all recreationalists over time progress towards a higher specialization level and as such will eventually become highly specialized (Bryan 1979).

Bryan’s conceptualization of specialization utilizes a typology based on three themes or dimensions that include the amount of participation, the type of technique used, and the settings preferred for a chosen recreational type. However, since Bryan’s original work other recreation specialization researchers have proposed that there should be additional variables included in the typology including experience use history, centrality to lifestyle, and enduring involvement as measures of recreation specialization (Chipmen and Helfrich 1988; Donnelly, Vaske, and Graefe 1986; Williams and Huffman 1986). Because of the multi-dimensionality of the recreation specialization measure, the concept is noted to be more useful to land managers in explaining recreation preferences, behaviors, and attitudes than simple socio-demographic characteristics or geographic variables (Song, Graefe, Kim, and Park 2018).

The concept of recreation specialization, as originally defined, relies on skill attainment from continuous involvement. Individuals that participate in recreation activities progress on a specialization continuum through the development of new skills and knowledge (Scott and Shafer 2001). Progression is not guaranteed and does not always take a simple linear course (Backlund and Kuentzel 2013; Kuentzel and Heberlein 2006). Some recreationalists may frequently participate in their chosen recreational activity but show no gain in skill or knowledge of the activity. At the same time others may participate in their chosen recreation activity infrequently but exhibit high skill levels (Scott and Shaefer 2001).

## **5.2 Recreation Specialization Applied to Recreation Groups**

Within the recreation literature recreation specialization has been used to measure recreationalists' behavior towards their chosen recreation activity. A majority of these studies have focused on single recreation activity including fishing (Ditton, Loomis, and Choi 1992; Needham, Sprouse, and Grimm 2009), hunting (Kuentzel and Heberlein 1992), canoeing and white-water activities (Bricker and Kersetzer 2000; Kuentzel and McDonald 1992), boating (Kuentzel and Heberlein 2006), rock climbing (Ewert and Hollenhorst 1994), and camping (McIntyre and Pigram 1992). Measures of recreation specialization that have been employed in these studies include the length and degree of involvement with an individual's chosen recreation activity as well as their attitudes and values that are described through the centrality of the recreation activity to that individual's identity (Bryan 2000).

Specialization is oftentimes defined as a three-dimensional construct based on a model that measures behavior, skill, and enduring involvement related to a recreational activity (McIntyre and Pigram 1992). Behavior is defined as the amount and extent of participation in a chosen recreation activity (Schreyer 1986). Skill is defined by the level of knowledge and

experience that an individual with regards to their chosen recreation activity. The idea of skill, knowledge, and experience acquisition is based on the premise that the longer a person participates in a certain activity the more skill, knowledge, and experiences that they will be able to obtain (Scott and Shafer 2001). Finally, enduring involvement, is measured by four sub-dimensions which includes enjoyment, importance, self-expression, and centrality to lifestyle that the recreation activity holds for the individual recreationalist. Enduring involvement, using these four sub-dimensions, is defined as the affective component of specialization (McIntyre and Pigram 1992).

While the dimensions of recreation specialization are generally agreed upon within the recreation literature, an agreement on how to measure the specialization concept is sparse. Researchers either measure recreation specialization as a multidimensional index (Donnelly, Vaske, and Graefe 1986; Miller and Graefe 2000) or through the underlying dimensions of experience, skill, and commitment separately (Kuentzel and McDonald 1992; McIntyre and Pigram 1992). Notwithstanding these measurement differences, recreation specialization allows land managers to recognize that discrete groups show different behaviors and have different needs. It allows managers to divide larger groups of recreationalists into meaningfully defined subgroups and become aware of the different management preferences, motivations, perceptions, and social norms of these subgroups.

### **5.3 Recreation Specialization Questions**

Recreation specialization questions were adapted from the Bricker and Kersetter (2000) survey used to study recreation specialization amongst whitewater recreationalists. Much like place attachment, recreation specialization is also conceived as a multidimensional construct containing three dimensions; level of experience, centrality to lifestyle, and enduring

involvement. Level of experience is a reflection of an individual's attachment to their recreation activity (McIntyre and Pigram 1992), centrality to lifestyle emphasizes the social aspects of participation in a recreation activity (McIntyre 1992), and enduring involvement is the underlying meaning that recreation activity has to the participant's life (McIntyre and Pigram 1992).

Respondents were asked to answer 20 questions related to recreation specialization. Two open-ended level of experience questions asked respondents to indicate how many years and how many times a month they participate in their chosen recreational activity. Four centralities to lifestyle questions asked respondents to answer a series of yes or no questions. Finally, 14 enduring involvement questions asked respondents to rate items on a five-point Likert scale where 1 = "strongly disagree" and 5 = "strongly agree".

#### **5.4 Recreation Specialization Results**

Before the analysis the two questions used to measure level of experience needed to be converted from opened-ended answers to standardized categories for comparison purposes. Years an individual has been participating in their chosen activity was converted to a factor by taking the number of years of participation in the activity and dividing it by the mean value of the age range selected by the respondent. This percentage was used to group the participants into five categories with one being the lowest and five being the highest value. Times that participants participate in their given activity by month was also converted to a factor by taking the number of days per month that respondents participated in their activity and dividing it by the average days in a month spread over a calendar year (30.42 days). This percentage was used to group participants into five categories with one being the lowest and five being the highest.

Furthermore, all centrality to lifestyle questions were binary and assigned a value of one for yes and zero for no.

Cronbach's alpha showed that the factor loadings for the recreation specialization scale, consisting of 20 items, reached good internal reliability  $\alpha = 0.87$  amongst the entire sample (Table 10). Cronbach's alpha for the level of experience dimension did not reach good internal reliability ( $\alpha = 0.084$ ), however the decision was made to keep these two questions as they were the only two questions in the survey instrument that measured level of experience. Additionally, by dropping these questions, the overall Cronbach's alpha for the entire sample would increase slightly from  $\alpha = 0.87$  to  $\alpha = 0.88$ . Similarly, Cronbach's alpha for centrality to lifestyle ( $\alpha = 0.63$ ) did not reach good internal reliability, however an alpha score of 0.5 or better is still considered to be an acceptable measure of internal consistency. On the other hand, Cronbach's alpha for enduring involvement ( $\alpha = 0.90$ ) did reach good internal reliability.

Table 10. Cronbach's alpha for the variables used to measure recreation specialization, level of experience, centrality to lifestyle, and enduring involvement across the entire sample.

	$\alpha$	$\alpha$	(r)
<b>Recreation Specialization</b>		0.87	0.27**
<b>Level of Experience</b>		0.084	0.044
How many years have you been participating in your chosen recreation activity <sup>1</sup>	0.88		
How many times a month do you participate in your chosen recreation activity <sup>1</sup>	0.88		
<b>Centrality to Lifestyle</b>		0.63	0.3***
Are you a member of any club affiliated with your chosen recreation activity	0.87		
Do you have magazine subscriptions related to your chosen recreation activity	0.87		
Do you own books related to your chosen recreation activity	0.86		
Do you frequent blogs or social media sites related to your chosen recreation activity	0.86		
<b>Enduring Involvement</b>		0.9	0.4***
My chosen recreation activity is one of the most enjoyable things I do	0.86		
My chosen recreation activity is one of the most satisfying things I do	0.86		
I enjoy discussing my chosen recreation activity with my friends	0.86		

Table 10. Continued

	$\alpha$	$\alpha$	(r)
My chosen recreation activity is very important to me	0.86		
When I am participating in my chosen recreation activity others see me the way I want them to see me	0.86		
When I am participating in my chosen recreation activity I can really be myself	0.86		
I can tell a lot about a person when I see them participating in my chosen recreation activity	0.86		
I find a lot of my life is organized around my chosen recreation activity	0.86		
Most of my friends are in some way connected to my chosen recreation activity	0.86		
I have accumulated a lot of equipment related to my chosen recreation activity	0.86		
I have invested a lot of money in equipment related to my chosen recreation activity	0.86		
I feel I have more equipment than other individuals that participate in my chosen recreation activity	0.86		
I often spend time learning about the newest equipment available for my chosen recreation activity	0.86		
In general, I am obtaining more equipment related to my chosen recreation activity each year	0.86		

\*\*\*Significant  $p \leq .001$ , \*\*Significant  $p \leq .01$ , \*Significant  $p \leq .05$

Note. Items measured using either a five-point scale (Strongly agree to strongly disagree) and a binary scale (yes or no)

<sup>1</sup> Retained these indicators in the final scale as these are the only indicators for level of experience and the improvement in the alpha absent these is minimal

Cronbach's alpha was also determined for each recreation group individually to assess the reliability of the recreation specialization scales for all the recreational activities included in the sample (Table 11). Cronbach's alpha for recreation specialization were similar for all groups; trail running ( $\alpha = 0.87$ ), hiking ( $\alpha = 0.85$ ), mountain biking ( $\alpha = 0.89$ ), and others ( $\alpha = 0.88$ ). Level of experience did not show good internal reliability for any of the recreation groups with hiking being the lowest ( $\alpha = 0.01$ ) followed by others ( $\alpha = 0.14$ ), trail running ( $\alpha = 0.16$ ), and mountain biking ( $\alpha = 0.24$ ). Cronbach's alpha for centrality to lifestyle for each recreation group reached acceptable internal reliability and was lowest for hiking ( $\alpha = 0.54$ ), similar for trail running ( $\alpha = 0.64$ ) and mountain biking ( $\alpha = 0.66$ ), and highest for others ( $\alpha = 0.70$ ). Finally, Cronbach's alpha for enduring involvement for all recreation groups reached good internal reliability were similar for trail running ( $\alpha = 0.90$ ), hiking ( $\alpha = 0.89$ ), mountain biking ( $\alpha = 0.91$ ), and others ( $\alpha = 0.92$ ). Overall recreation specialization as a construct and enduring involvement

as a dimension of the recreation specialization construct showed good internal reliability for each of the recreation groups.

Table 11. Comparison of Cronbach's alpha for recreation specialization, level of experience, centrality to lifestyle, and enduring involvement between recreation groups.

	Recreation Group							
	Trail Running		Hiking		Mountain Biking		Others	
	$\alpha$	(r)	$\alpha$	(r)	$\alpha$	(r)	$\alpha$	(r)
<b>Recreation Specialization</b>	<b>0.87</b>	<b>0.27**</b>	<b>0.85</b>	<b>0.24*</b>	<b>0.89</b>	<b>0.31***</b>	<b>0.88</b>	<b>0.26**</b>
Level of Experience <sup>1</sup>	0.16		0.01		0.24		0.14	
Centrality to Lifestyle	0.64		0.54		0.66		0.70	
Enduring Involvement	0.90		0.89		0.91		0.92	

\*\*\*Significant  $p \leq .001$ , \*\*Significant  $p \leq .01$ , \*Significant  $p \leq .05$

Note. Items measured using either a five-point scale (Strongly agree to strongly disagree) and a binary scale (yes or no)

<sup>1</sup> Retained level of experience in the final scale because the improvement in the alpha absent these is minimal

An additive specialization index was created and standardized into Z-scores. These scores were divided into three categories; advanced, intermediate, and beginner based on one standard deviation from the median (Table 12). A Kruskal-Wallis test showed that there was a statistically significant difference amongst at least one of the recreation groups and their associated recreation specialization index scores ( $\chi^2 = 75.32$ ,  $df=3$ ,  $p<0.001$ ). To identify the recreation groups that differed from one another a post hoc Tukey Honest Significant Difference (Tukey HSD) multiple comparison test was employed. The post hoc test identified that mountain bikers had the highest mean recreation specialization index value ( $M = 3.41$ ). It also showed that hikers were significantly different from mountain bikers, trail runners, and other recreation groups in regard to recreation specialization (Table 13). A Mann-Whitney *U*-test was performed to compare median values of the questions used to compile the recreation specialization index and in order to gain a more detailed understanding of the differences between hikers, trail runners, mountain bikers, and other recreation groups (Table 14).

Table 12. Number and percentage of recreation specialization in each recreation group.

Recreation Group	Recreation Specialization Levels					
	Advanced		Intermediate		Beginner	
	n	%	n	%	n	%
Hiking	26	5.6	326	69.8	115	24.6
Mountain Biking	43	19.8	144	66.4	30	13.8
Trail Running	41	15.6	187	71.9	32	12.3
Others	7	15.6	34	73.3	3	11.1

**Note.** An additive recreation specialization index was created and standardized into Z-scores. These scores were divided into three categories; advanced, intermediate, and beginner based on one standard deviation from the median.

Table 13. Differences in mean recreation specialization index scores by recreation group.

Recreation Specialization Index	Recreation Group							
	Mountain Biking		Trail Running		Others		Hiking	
	Mean	Group	Mean	Group	Mean	Group	Mean	Group
	<b>3.41</b>	<b>a</b>	<b>2.14</b>	<b>a</b>	<b>1.91</b>	<b>a</b>	<b>-3.0</b>	<b>b</b>

Values with different subscripts are significantly different at the 0.05 level based on a Tukey HSD post hoc test.

Table 14. Differences in median recreation specialization variables and recreation specialization by recreation group.

Recreation Specialization Level of	Recreation Group							
	Hiking		Trail Running		Mountain Biking		Others	
	Median	SD	Median	SD	Median	SD	Median	SD
Recreation Specialization Level of	-1.69	10.44	3.31***	10.42	5.31***	11.11	2.31	10.86
How many years have you been participating in your chosen recreation activity	3	1.30	2	1.03	3**	1.08	2	1.27
How many times a month do you participate in your chosen recreation activity	2	1.40	3	1.31	2*	1.34	3*	1.43
Are you a member of any club affiliated with your chosen recreation activity	0	0.33	0***	0.49	0***	0.47	0	0.42
Do you have magazine subscriptions related to your chosen recreation activity	0	0.34	0***	0.46	0***	0.46	0***	0.48
Do you own books related to your chosen recreation activity	1	0.48	1	0.46	1	0.47	1	0.44
Do you frequent blogs or social media sites related to your chosen recreation activity	0	0.49	1***	0.50	1***	0.47	0	0.51
My chosen recreation activity is one of the most enjoyable things I do	5	0.82	5**	0.70	5	0.86	5	0.92
My chosen recreation activity is one of the most satisfying things I do	5	0.77	5**	0.71	5	0.87	5	1.00
I enjoy discussing my chosen recreation activity with my friends	4	0.95	5**	0.92	5*	0.91	5	1.13

Table 14. Continued

	Recreation Group							
	Hiking		Trail Running		Mountain Biking		Others	
	Median	SD	Median	SD	Median	SD	Median	SD
My chosen recreation activity is very important to me	5	0.73	5	0.69	5	0.86	5	0.81
When I am participating in my chosen recreation activity others see me the way I want them to see me	4	1.04	4	1.03	4	1.00	4	1.10
When I am participating in my chosen recreation activity I can really be myself	5	0.88	5	0.82	5	0.92	5	0.104
I can tell a lot about a person when I see them participating in my chosen recreation activity	4	1.09	4	1.02	4	1.03	4	1.10
I find a lot of my life is organized around my chosen recreation activity	4	1.07	5***	0.91	4**	0.94	4	1.05
Most of my friends are in some way connected to my chosen recreation activity	4	1.12	4**	1.15	4	1.12	4	1.21
I have accumulated a lot of equipment related to my chosen recreation activity	4	1.32	4***	1.20	5***	1.02	4***	1.32
I have invested a lot of money in equipment related to my chosen recreation activity	3	1.36	4***	1.27	5***	1.02	4***	1.34
I feel I have more equipment than other individuals that participate in my chosen recreation activity	2	1.17	3***	1.16	3***	1.21	3**	1.31
I often spend time learning about the newest equipment available for my chosen recreation activity	-1.69	10.44	3.31***	10.42	5.31***	11.11	2.31	10.86
In general, I am obtaining more equipment related to my chosen recreation activity each year	2	1.28	3***	1.24	4***	1.21	3***	1.28

\*\*\*Significant  $p \leq .001$ , \*\*Significant  $p \leq .01$ , \*Significant  $p \leq .05$

A Kruskal-Wallis test showed that there was a statistically significant difference between recreation groups and recreation specialization indexes.

Note. Items measured using either a five-point scale (Strongly agree to strongly disagree) and a binary scale (yes or no)

Cronbach's alpha showed that the factor loadings for the recreation specialization scale, consisting of 20 items, reached good internal reliability and was the similar for Non-Boulder ( $\alpha = 0.88$ ) and City of Boulder residents ( $\alpha = 0.87$ ) (Table 15). The Cronbach's alpha for level of experience reached poor internal reliability for both City of Boulder ( $\alpha = 0.04$ ) and Non-Boulder ( $\alpha = 0.01$ ) residents. Centrality to lifestyle Cronbach's alpha reached acceptable internal reliability and was similar for City of Boulder ( $\alpha = 0.63$ ) and Non-Boulder ( $\alpha = 0.62$ ) residents.

The Cronbach's alpha for enduring involvement reached good internal reliability ( $\alpha = 0.90$ ) for both City of Boulder and Non-Boulder residents.

Table 15. Comparison of Cronbach's alpha for recreation specialization, level of experience, centrality to lifestyle, and enduring involvement between City of Boulder and Non-Boulder residents.

	Residence			
	City of Boulder		Non-Boulder	
	$\alpha$	(r)	$\alpha$	(r)
<b>Recreation Specialization</b>	<b>0.87</b>	<b>0.27**</b>	<b>0.88</b>	<b>0.28**</b>
Level of Experience <sup>1</sup>	0.04		0.01	
Centrality to Lifestyle	0.63		0.62	
Enduring Involvement	0.90		0.90	

\*\*\*Significant  $p \leq .001$ , \*\*Significant  $p \leq .01$ , \*Significant  $p \leq .05$

**Note.** Items measured using either a five-point scale (Strongly agree to strongly disagree) and a binary scale (yes or no)

<sup>1</sup> Retained level of experience in the final scale because the improvement in the alpha absent these is minimal

An additive recreation specialization index was created and standardized into Z-scores. These scores were divided into three categories; advanced, intermediate, and beginner based on one standard deviation from the median (Table 16). For a comparison of the recreation specialization index scores between City of Boulder and Non-Boulder residents a one-way ANOVA test showed that there was not a statistically significant difference in relation to recreation specialization index scores between the two groups (ANOVA:  $F=0.03$ ,  $d.f=1$ ,  $p=0.86$ ).

Table 16. Number and percentage of recreation specialization in by residence.

Residence	Recreation Specialization Levels					
	Advanced		Intermediate		Beginner	
	n	%	n	%	n	%
City of Boulder	47	11.0	305	71.3	76	17.8
Non-Boulder	70	12.5	385	68.6	106	18.9

**Note.** An additive recreation specialization index was created and standardized into Z-scores. These scores were divided into three categories; advanced, intermediate, and beginner based on one standard deviation from the median.

## Chapter 6: Recreation Motivation

### 6.1 Motivation as a Concept

Motivation is both a psychological construct which is used to guide individuals toward a desired goal and a psychological force that can reinforce the resulting desired action resulting in an individual's behavior (Schacter 2011). It is the "process that accounts for an individual's intensity, direction, and persistence of effort toward attaining a goal" (Robbins 2003, p.155). Actions are guided through perceptions, thoughts, emotions, skills and activities that either lead to goal engagement or goal disengagement. Goal engagement is a state in which an individual is focused on what is important putting in place key procedures, focusing on relevant stimuli that trigger or cue a behavior, and disengaging from potential distractions. On the other hand, goal disengagement is a counter action to goal engagement where the individual becomes disengaged from an original goal in order to seek alternative goals, to defend the self-esteem from experiencing failure, and to protect against motivational resources that may be needed in the future (Heckhausen, Wrosch, and Schultz 2010). Goal engagement and goal disengagement are considered to be the binary opposites of go and stop and focus an individual's cognitive, behavioral, and motivational activities (Heckhausen and Heckhausen 2018).

Although motivation is generally treated as a single construct, Deci and Ryan (1985) note that there are three types of motivation; intrinsic, extrinsic, and amotivational. Intrinsic motivations are driven from within the self, extrinsic motivations are driven by outside forces, and amotivational is the absence of any motivation be it internal or external. This multi-dimensional representation recognizes that individuals are motivated by a number of different factors. Perhaps one of the most vexing questions, when comparing motivations between

individuals, is identifying whether people are motivated by their own interests or from interests that exist outside of themselves (Deci and Ryan 1985).

Motivations are also said to be based on the expectancy theory, first proposed by Campbell, Dunnette, Lawler, and Weick (1973) which suggests that people engage in certain activities in specific places to realize some sort of group of psychological outcomes that are known, expected, or valued. Expectancy theory is composed of three premises – expectancy, instrumentality, and valence – which are thought to drive motivation. Expectancy is the anticipation that an action will lead to a certain outcome. Instrumentality is the anticipation that a certain outcome will lead to a certain reward. And, valence is the preference that an individual has from the outcome. How an individual perceives each of these variables is key determinant in understanding motivational forces that underlie an individual's actions (Lloyd and Mertens 2018).

## **6.2 Motivation Applied to Recreation Groups**

Asking “why” people participate in recreation activities has been a central concern in recreational research since Driver and Tochner (1970) defined recreation as a psychophysiological experience that is self-rewarding, occurs during non-obligated free time, and is the result of free choice. They also stated that recreational activities are understood as an individual's pursuit in obtaining a certain physical and/or psychological goal. Motivation to participate in nature-based recreation is a behavior that extends beyond the activity itself but instead encompasses an array of psychological, social, and physiological outcomes that are interlinked with the natural setting. Manfredi, Driver, and Tarrant (1996) noted that gaining an understanding of recreationalists' motivations are instrumental for gaining an understanding of the reasons for why people participate in recreational activities.

Driver and Tocher (1970) stated that recreational activities are understood as an individual's pursuit in obtaining a certain physical and/or psychological goal and developed the Recreation Experience Preference (REP) framework to study recreational motivation and explore participant's outcomes. This model assumes that recreation motivation is enacted to fulfill a recreationalist's certain psychological and physical objectives in which expectations related to the recreational activity will enable the individual to obtain certain desired outcomes (Aşan and Emeksiz 2016).

Originally, the REP, consisted of 328 items representing 19 particular domains. Manfredi et al. (1996) conducted a meta-analysis of 36 different motivational studies that used REP scales and found general support for the initial motive domains and scales. Kyle, Graefe, and Manning (2004) concurrently found, in their own meta-analysis of studies based on the REP scale, that a number of studies employing REP scales have used smaller item lists and domains based on what is deemed important to a particular activity and/or setting. They found that the most common motivational domains included escape, solitude, being close to nature, and social interaction. Overall, there is general consensus in the recreation literature that motivation for participation in any given recreational activity is varied amongst individuals and settings.

### **6.3 Recreation Motivation Questions**

Motivations were selected from Driver, Tinsley, and Manfredi's (1991) study based on Kyle, Bricker, Graefe, and Wickham's (2004) claim that Driver's REP scales only capture several values associated with natural places and nature-based recreation. They suggest that motivation item selection, from the REP scale, should be chosen based on the researcher's knowledge of the recreation groups being studied and the context of the landscape. Of the 386 REP items, 19 were chosen that fall under six motivation domains (domains in motivation

research are typically represented by two or more REP scale items); level of control, physical setting, catharsis, creativity, recognition, and challenge and risk that were deemed applicable to all recreation groups being studied. Respondents were asked to select and rank their three primary motivations for participating in their chosen recreation activity.

## 6.4 Motivation Results

The top three motivations selected by individuals were converted to values of one. Each of the 19 motivation variables were then summed. Summed values, for the motivation variables, were used to establish the top three motivations by group (Table 17).

Table 17. Top three motivations and motivational dimensions amongst the recreation groups.

Recreation Group	Motivations					
	Motivation 1		Motivation 2		Motivation 3	
	Motivation	Dimension	Motivation	Dimension	Motivation	Dimension
Hikers	For physical fitness	Level of Control	To enjoy nature	Physical Setting	To be close to nature	Physical Setting
Trail Runners	For physical fitness	Level of Control	To enjoy nature	Physical Setting	To be close to nature	Physical Setting
Mountain Bikers	For physical fitness	Level of Control	To enjoy nature	Physical Setting	To be close to nature	Physical Setting
Others	For physical fitness	Level of Control	To enjoy nature	Physical Setting	For relaxation	Catharsis

Individual motivations were then aggregated into their respective dimensions. Means scores were calculated on each of the motivational dimensions to compare differences or similarities amongst the groups. One-way ANOVA analysis on each motivation dimension by recreation group showed that there was a significant difference between the recreation groups on the motivational dimensions of physical setting (ANOVA:  $F=23.3$ ;  $d.f.=3$ ;  $p<0.001$ ), level of control (ANOVA:  $F=7.8$ ;  $d.f.=3$ ;  $p<0.001$ ), challenge/risk (ANOVA:  $F=8.3$ ;  $d.f.=3$ ;  $p<0.001$ ), and recognition (ANOVA:  $F=8.9$ ;  $d.f.=3$ ;  $p<0.001$ ). To identify the recreation groups that differed from one another based on motivation dimension a post hoc Tukey Honest Significant Difference (Tukey HSD) multiple comparison test was employed. It showed that hikers were significantly different from mountain bikers and trail runners in regard to the physical setting,

level of control, and recognition motivation dimensions. Hikers were also significantly different than mountain bikers on the challenge/risk motivation dimension (Table 18).

Table 18. Comparison of motivational dimensions between recreation groups.

Motivation Dimension	Recreation Group								F value
	Hiking		Trail Running		Mountain Biking		Others		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Physical Setting	0.40 <sup>a</sup>	0.22	0.40 <sup>b</sup>	0.21	0.30 <sup>b</sup>	0.22	0.33 <sup>ab</sup>	0.26	23.3***
Level of Control	0.26 <sup>b</sup>	0.18	0.32 <sup>a</sup>	0.19	0.33 <sup>a</sup>	0.19	0.30 <sup>ab</sup>	0.24	7.8***
Catharsis	0.16 <sup>a</sup>	0.15	0.17 <sup>a</sup>	0.16	0.17 <sup>a</sup>	0.16	0.17 <sup>a</sup>	0.17	1.4
Challenge/Risk	0.04 <sup>b</sup>	0.1	0.08 <sup>ab</sup>	0.13	0.08 <sup>a</sup>	0.12	0.10 <sup>ab</sup>	0.14	8.3***
Creativity	0.03 <sup>a</sup>	0.1	0.03 <sup>a</sup>	0.09	0.02 <sup>a</sup>	0.08	0.04 <sup>a</sup>	0.11	1.0
Recognition	0.001 <sup>b</sup>	0.1	0.04 <sup>a</sup>	0.15	0.04 <sup>a</sup>	0.13	0.01 <sup>ab</sup>	0.07	8.9***

\*\*\*Significant  $p \leq .001$ ,

Values with different subscripts are significantly different at the 0.05 level based on a Tukey HSD post hoc test.

A Multinomial Logistic Regression was used to analyze predictors for the top three motivational dimensions. Individuals who ranked one of the three bottom motivational dimensions as their top motivational dimension were dropped from the analysis due to their low counts which would preclude the ability to elicit relevant probabilistic explanations from the logistical model. These motivational dimensions were challenge/risk (n=60), creativity level (n=16), and recognition (n=14). Differences analyzed were between the physical setting motivational dimension and level of control motivational dimension, as well as the difference between the physical setting motivational dimension and the catharsis motivational dimension. The main interest of running this analysis was to find the probability predictions of the top motivational dimensions by using the predictor variables of recreation activity (hiking, trail running, mountain biking, and other), levels of place attachment (high, medium, and low), and levels of recreation specialization (advanced, intermediate, beginner), while controlling for the

sociodemographic variables of gender, age, education, employment status, income, ethnicity, and residency.

Overall, the model was predictive of group classification ( $\chi^2=104.5$ , d.f.=22,  $p<0.001$ ; McFadden  $R^2=.05$ ). The model correctly classified 51.7 percent of all participants in the sample, with 68.5 percent of those with the physical setting motivational dimension as their top motivation being classified correctly, 54.4 percent of those with the level of control motivational dimension, and one percent of those with the catharsis motivational dimension.

Results from the model suggests that when comparing the motivational dimensions of level of control with physical setting (reference category) the variables recreation activity (OR=0.62), gender (OR=-0.43), and age (OR=0.27) significantly increase the probability of an individual choosing level of control as their top motivational dimension over the physical setting motivational dimension. Alternatively, when comparing the motivational dimensions of catharsis with the physical setting (reference category) the variables recreation activity (OR=0.37) and gender (OR=-0.43) significantly increase the probability of an individual choosing catharsis as their top motivational dimension over physical setting (Table 19).

Table 19. Predictors for the physical setting motivational dimension.

Recreation Motivation Dimension		OR	SE	t
<b>Level of Control</b>	Intercept	-2.51**	0.85	-2.97
	Place Attachment	-0.06	0.16	-0.36
	Recreation Specialization	0.32*	0.15	2.09
	Recreation Activity	0.62***	0.09	6.82
	Gender	-0.43**	0.16	-2.68
	Age	0.27***	0.06	4.43
	Education	-0.03	0.09	-0.33
	Employment	0.22	0.12	1.87
	Income	-0.10	0.08	-1.29
	Ethnicity	-0.14	0.30	-0.47
	Residency	-0.08	0.16	-0.49

Table 19. Continued

Recreation Motivation Dimension		OR	SE	t
<b>Catharsis</b>	Intercept	-1.69	1.06	-1.60
	Place Attachment	-0.07	0.21	-0.35
	Recreation Specialization	0.26	0.19	1.37
	Recreation Activity	0.37**	0.11	3.24
	Gender	-0.43**	0.16	-2.68
	Age	0.04	0.07	0.47
	Education	0.05	0.20	0.52
	Employment	0.12	0.15	0.81
	Income	0.19	0.10	1.91
	Ethnicity	-0.32	0.39	-0.82
Residency	-0.36	0.20	-1.79	

\*\*\*Significant  $p \leq .001$ , \*\*Significant  $p \leq .01$ , \*Significant  $p \leq .05$

Model chi-square = 104.5;  $p < 0.001$ , Pseudo  $R^2$  (McFadden) = 0.05

Note. Reference group: Physical setting (n=391). OR = Odds Ratio. SE = Standard Error

## Chapter 7: Discussion and Management Implications

### 7.1 Discussion

#### 7.1.1 Place Attachment: Entire Sample and Recreation Groups

Cronbach's alpha reached good internal reliability for the place attachment construct and the two dimensions of place attachment, place identity and place dependence amongst the entire study sample. Similarly, place attachment, place identity, and place dependence reached good internal reliability for all recreation groups. Overall, within the study sample and the individual recreation groups, the place attachment construct showed good internal reliability and is a good measure of the concept for the study's sample.

Out of all the recreation groups trail runners had the highest percentage of individuals classified as having high place attachment and mountain bikers had the lowest percentage of individuals classified as having high place attachment to lands managed by OSMP. Trail runners also had the lowest percentage of individuals classified as having low place attachment. Furthermore, trail runners had the highest mean place attachment index and as a group was significantly different from hikers, mountain bikers, and other recreation groups.

Trail runners had the highest median for one variable; "OSMP lands are the best place for the kind of recreation I like to do". This question falls under the place dependence dimension of the place attachment construct and implies that OSMP lands are efficiently facilitating specific setting needs of trail runners as a group. The fact that trail runners, as a group, have the highest percentage of individuals classified as having high place attachment, have the highest mean place attachment index scores, and have the highest median value score for a question that identifies Boulder as one of the best places for their kind of recreational pursuit should not surprise OSMP managers as Boulder is considered to be a major trail running hub in the United States. This

finding, in which trail runners view Boulder as the best place to participate in their recreational activity, could also indicate that other recreation groups can find alternative landscapes within the region, or farther afield, to participate in their chosen recreation activity and there may be a reason that OSMP lands are not meeting their needs, in terms of places to pursue their recreational activities. OSMP managers could conduct future research that enables them to analyze places that other recreation groups are able to substitute for their chosen recreation activity. Other studies could also ask recreation groups why OSMP lands are not meeting their place-based needs, providing managers with an understanding if management actions or particular features of the landscape are having a negative impact on the experiences or functional utility of the lands that are managed by OSMP.

#### *7.1.2 Place Attachment: Boulder and Non-Boulder Residents*

Cronbach's alpha reached good internal reliability for the place attachment scale for both City of Boulder and Non-Boulder residents. Good internal reliability was also shown for place identity and place dependence amongst the two groups. As with all recreation groups, the place attachment construct showed good internal reliability and is a good measure of the concept for the study's sample.

Non-Boulder residents had the highest percentage of individuals classified as having low place attachment to OSMP lands, with the other place attachment levels of high and medium being somewhat similar in terms of percentage of individuals classified into those groups. Boulder residents had a higher place attachment mean index score than Non-Boulder residents and there was a significant difference between City of Boulder and Non-Boulder residents. City of Boulder residents had a higher median value for one variable; "One of the reasons that I live where I live is because of OSMP lands". This variable falls under the place dependence

dimension of place attachment and aligns with Boulder resident's support and valuation of open space as well as the fact that Boulder is viewed as one of the outdoor sports capitals in the United States outlined in the Chapter 2 of this dissertation.

What is interesting about the other place attachment variables is the fact that the median values remain just as high for Boulder and Non-Boulder residents. Originally the residence variable in the demographic section of the survey included 11 choices, many of which were specific surrounding communities of the City of Boulder. High median values could point to the fact that those that live around the lands managed by OSMP are just as valuable to the surrounding communities as they are to City of Boulder residents.

Williams and Vaske (2003) found that recreation areas that were in close proximity to an individual's home might not provide the best recreation experience but because of the convenience and resulting frequent visitation these places exhibited strong place dependence amongst the study participants. It has also been shown that visitors to an area show lower place dependence than long-term residents that live within close proximity to that area (Hammitt, Backlund, and Bixler 2004). Recreation area proximity has also been linked to place attachment (Budruk, Thomas, and Tyrrell 2009) and as with place dependence has been shown to be stronger amongst residents than with visitors (Kaltenborn and Williams 2002).

Results of place attachment comparisons between City of Boulder and Non-Boulder residents suggests that OSMP land managers are faced with the challenge of balancing the experiential opportunities of residents and non-residents alike. It also points to the fact that more research between residents and visitors needs to take place within these recreation areas. It is particularly important for OSMP managers to gain a greater understanding of what the draw of

OSMP lands are for recreationalists that live in surrounding communities whom are able to easily access OSMP lands for their recreational pursuits.

### *7.1.3 Recreation Specialization: Entire Sample and Recreation Groups*

Cronbach's alpha reached good internal reliability for the recreation specialization construct as well for the enduring involvement dimension amongst the entire sample. Cronbach's alpha, for the centrality to lifestyle dimension, reached acceptable reliability, while Cronbach's alpha for level of experience did not reach an acceptable level of internal reliability. For each recreation group and similar to the entire sample, Cronbach's alpha reached good internal reliability for the overall recreation specialization construct and the enduring involvement dimension. Similar to the entire sample, Cronbach's alphas for centrality to lifestyle dimension of recreation specialization showed acceptable internal reliability and poor internal reliability for level of experience. Overall, the recreation specialization construct showed good internal reliability and is viewed as a good measure of the entire construct amongst the entire sample and the individual recreation groups. However, when the individual dimensions of level of experience, centrality to lifestyle, and enduring involvement were examined amongst the entire sample good internal reliability was only found for the enduring involvement dimension.

When measuring recreation specialization there is not a general consensus within the recreation literature of whether the recreation specialization construct should be examined as a multidimensional index (Donnelly, Vaske, and Graefe 1986; Miller and Graefe 2000) or as individual underlying dimensions (McIntyre and Pigram 1992; Bricker and Kersetter 2000; Kuentzel and McDonald 1992). Song, Graefe, Kim, and Park (2018) noted that while simplistic, using the multidimensional approach to construct an additive index for recreation specialization obscures any of the explanatory detail that may be present for each of the dimensions that make

up the construct. For example, it has been found that some recreationalists may participate in their chosen activity frequently while not attaining additional skill levels or knowledge related to that activity. At the same time, other recreationalists, may participate in their chosen activity infrequently but attain additional skill levels or show higher levels of involvement (Scott and Shafer 2001). Song et al. (2018) then proceed to argue that by combining multiple dimensions into one construct can lead to conceptual ambiguity.

Within discrete recreation groups there are unique characteristics and categories and the indicators for recreation specialization may be slightly different depending on the recreation activity. In this study, when looking at the two recreation specialization dimensions that reached acceptable and poor internal reliability – level of experience and centrality to lifestyle respectively – Cronbach’s alpha scores are indeed varied though none of them taken individually by recreation group would reach the level of good internal reliability. These dimension then may not be a good measure for any of the recreation groups sampled and may need to be adjusted in future studies on recreation specialization done on OSMP lands.

Out of all the recreation groups, hikers had the highest percentage of individuals classified as having the beginner recreation specialization level and the lowest percentage of individuals having the advanced recreation specialization level. Mountain bikers had the highest percentage of individuals classified as having advanced recreation specialization levels. Mountain bikers had the highest mean recreation specialization index and hikers as a group were significantly different from mountain bikers, trail runners, and other recreation groups.

Hikers had lower median values four variables: “I have invested a lot of money in equipment related to my chosen recreation activity”; “I feel I have more equipment than other individuals that participate in my chosen recreation activity”; “I often spend time learning about

the newest equipment available for my chosen recreation activity”; and “In general, I am obtaining more equipment related to my chosen recreation activity each year”. All of these variables fall under the enduring involvement dimension and have to do with equipment and investment.

Hiking, it could be argued, presents the lowest barrier to entry to recreationalists amongst the other recreation groups involved in the study. When compared to the other recreation activities and in a front country setting such as the trailheads where the study took place, hikers do not need any special equipment in order to participate in their chosen activity beyond shoes and clothing. Even these items do not necessarily need to be hiking specific. Additionally, hikers in the study had the lowest median recreation specialization index scores. Similar to the equipment and investment variables, the fact that OSMP trailheads, where the study took place are indicative of a front-country recreational experience hiking there may be less intimidating than a backcountry or wilderness hiking experience. Individuals could simply be using these places to go for walks and as such classify themselves as hikers in the survey but may not make that distinction in their day-to-day lives. In future studies there may need to be two distinct recreation groups of hikers and walkers. This observation is particularly valuable to OSMP managers because hikers were the largest recreation group in the sample.

Further studies could be undertaken by OSMP to examine how hikers classify their own recreational specialization values as well as the experiential expectations that they are seeking on OSMP lands. Oftentimes management decisions made by land managers are justified by meeting the needs of those in particular recreation groups that have the highest levels of recreation specialization (Bricker and Kerstetter 2000). However, because of the low recreation specialization index scores amongst hikers, OSMP should look to further understand what makes

up hikers' goals and experiences when recreating on OSMP lands. They should also take into account the recreation expectations of those that rank low in the recreation specialization construct amongst the other recreation groups when making management decisions to ensure that all skill-levels are afforded with the opportunity to pursue their recreation activities on OSMP lands. In the context of publicly managed landscapes it is often the most specialized individuals that have dedicated groups and organizations that show up and have the strongest voices in the planning process. Low to medium specialized individuals are often left out of the discussion and as a result left out of the planning process.

Further studies could also be undertaken to gain a greater understanding of the physical setting preferences that each of the recreation groups has when choosing to pursue their activities at different locations managed by OSMP. MacFarlane (2004) found that as individuals become more specialized, they are able to more explicitly articulate what site attributes attract them do different locations. Recreation sites have many social, physical, and psychological characteristics that appeal to recreational users of different specialization levels and having a clearer understanding of attribute preferences would allow managers at OSMP to better address the needs of a diverse set of recreation groups. It could also allow them to find out where the gaps in the system are in that there are settings not available to either high or low recreation specialists and make management decisions accordingly. Those with low specialization levels may seek out settings that are relaxing, while those with high specialization levels may seek out setting that are challenging, and understanding site attribute preferences would allow OSMP managers to make adjustments to management plans where needed.

#### *7.1.4 Recreation Specialization: Boulder and Non-Boulder Residents*

Similar to the entire study sample, Cronbach's alpha reached good internal reliability for the recreation specialization construct as well for the enduring involvement dimension between City of Boulder and Non-Boulder residents. Cronbach's alpha, for the centrality to lifestyle dimension, reached acceptable reliability, while Cronbach's alpha for level of experience did not reach an acceptable level of internal reliability. The recreation specialization construct showed good internal reliability and is viewed as a good measure of the entire construct for City of Boulder and Non-Boulder residents. However, when the individual dimensions of level of experience, centrality to lifestyle, and enduring involvement were examined between the two groups internal reliability was only found for the enduring involvement dimension. A detailed discussion above outline the debate within the recreation literature of whether recreation specialization should be measured as a single construct consisting of multiple dimensions or if each dimension should be evaluated separately. While it focuses on individual recreation groups, the same logic can be applied to residents and visitors to a particular location. This is supported in this study by the fact that there was no significant difference between City of Boulder and Non-Boulder residents when it comes to their recreation specialization scores.

#### *7.1.5 Motivation: Differences in Recreation Groups*

The top two motivations, among all the recreation groups, was "For physical fitness" that falls under the level of control motivational dimension and "To enjoy nature" which falls under the physical setting motivational dimension. The third highest motivation for hikers and trail runners was "To be close to nature" which falls under the physical setting motivational dimension, while the third motivation for others was "For relaxation" which falls under the catharsis motivational dimension. Examining the top three motivations and motivational

dimensions between the recreation groups (notwithstanding the “For relaxation” identified by other recreation groups as their third highest motivation) reveals that individuals in all recreation groups are seeking out natural landscapes for their physical fitness activities and that there is a close relationship with being in a natural setting (OSMP lands) and physical exercise (recreation activity).

Protected areas, such as lands managed by OSMP, serve a vital role in preserving natural ecosystems, but this finding also points to the fact that they may be serving a vital role in providing the settings that can help to sustain the health and well-being of those that recreate on them. There is a wide array of empirical research that individuals that come into contact with the natural world experience broad psychological and physical benefits and those participating in physical activities in the natural world have higher levels of subjective well-being (McMahan 2018). Recreationalists in natural environments, no matter their recreation activity, show improvements in psychological feelings and physical functioning (Mitchell 2013). Bowler, Buyung-Ali, Knight, and Pullin (2010) found that those participating in physical activities in natural environments experienced a more pleasurable experience when compared to those that participated in physical activities indoors or in an urban environment. While urban parks and indoor gyms are oftentimes more easily accessible and have a host of infrastructure and facility provisions not found in protected areas, Maller, Townsend, Pryor, Brown, and St. Leger (2008) noted that natural landscapes provide a more diverse set of human health and well-being benefits (e.g., physical, psychological, social, and environmental).

Individuals’ decisions to use natural places for physical activities are oftentimes driven by accessibility, features, condition, and actual and perceived safety of the physical environment (Lee and Maheswaran 2011). Over the past couple of decades people are spending more of their

lives indoors (MacKerron and Mourato 2013) and less of their time in nature (Soga and Gaston 2016). OSMP land managers should be aware that OSMP lands are not only a natural setting for recreation but also a health resource to those that recreate on them. Additional studies can be conducted to identify the actual health outcomes among the recreationalists that use OSMP lands and can be incorporated into the management of the lands with public health of the recreationalists as a management strategy (Romanillos et al. 2018).

#### *7.1.6 Motivation: Predictors for Top Recreation Motivational Dimension*

To better understand recreationalists' top three motivational dimension choices – physical setting, level of control, and catharsis – a Multinomial Logistic Regression used the predictors of place attachment and recreation specialization levels, recreation activity, and sociodemographic variables. The multinomial logistic regression model, comparing the physical setting motivational dimension with the level of control and catharsis motivational dimensions, provided sufficient evidence that the variables recreation activity and gender were significant predictors for choosing level of control or catharsis motivational dimension over the physical setting motivational dimension. Additionally, the model provided sufficient evidence that the recreation specialization level variable was a significant predictor for an individual choosing the level of control of motivational dimension over the physical setting motivational dimension.

The findings in the study that recreation activity, being a significant predictor when comparing both level of control and catharsis to the reference category of physical setting, is a key determinant of what recreational motivation dimension was selected by individual recreationalists in the study and is widely supported in the recreation literature (Brown 1981; Driver 1976; Scott et al. 2005; Ewert 1994; Hvenegaard 2002). The recreation specialization level finding is also supported by past research that has shown that motivations change as people

advance along the continuum of the recreation specialization construct (Chipman and Helfrich 1988; Ditton, Loomis, and Choi 1992; Scott and Shafer 2001). What is unique about this study is that the association between recreation specialization levels and motivations were compared across four recreation groups. There are not many recreation areas that are managed explicitly for one recreation group. This study's findings that recreation activity is a key predictor of recreation motivation is indicative that OSMP land managers should conduct future studies that seek to understand site characteristics and site preferences that draw recreationalists to the different locations within their system.

Furthermore, the model did not find that place attachment levels were a significant predictor for any of the three motivational dimensions which is interesting when compared to other studies that have used place attachment as a predictor for motivation. There is a recognition, in the recreation literature that more research needs to be undertaken that explores the relationship between place attachment models and their ability to predict recreation behavior (Hammitt, Kyle, and Oh 2009). A number of studies have indicated that place attachment levels may influence individual's motivations to recreate on the landscapes they are attached to (Fredman and Heberlein 2005; Kyle et al. 2004; Schroeder 1996), treating place attachment as a predictor variable that has an influence on the outcome variable of recreation motivation. Budruk and Stanis (2013) suggest using a more qualitative approach to explore place attachment and recreation motivation formation, something that OSMP managers could conduct in the future.

For land managers at OSMP it is important to recognize that different recreation groups may differ in their recreation motivations and their recreation specialization levels. This is particularly relevant to agencies such as OSMP who manage many multi-use trails where motivations between recreation groups may be incompatible and a one size fits all strategy would

not be applicable. If further research identifies areas managed by OSMP where incompatibilities exist, managers should determine strategies that mitigate these differences without placing the needs of one recreation group over the other. Management strategies should be based on the “best” mix of recreation experience opportunities (Lee, Scott, and Moore 2002).

## **7.2 Management Implications**

Broadly speaking, this study contributes to the previous recreation literature on place attachment, recreation specialization, and motivation by developing a framework that uses place attachment and recreation specialization as predictors for motivation that can be adapted to other locations. What is unique about the study and the results is that four distinct recreation groups were studied across different sites on a landscape managed by a local municipality’s public land management agency, Boulder’s OSMP. Lands available for recreation that are managed by OSMP are a result of a concerted effort by City of Boulder residents that started in the late 1960s and management decisions are made at the local level. Arguably this local support and management regime could be considered to be more proactive and flexible when making management decisions. This is contrary to much of the recreation research that takes place on federally managed landscapes where the land theoretically belongs to all citizens of the country and management decisions are oftentimes made reactively under the guise of a central management regime steeped in bureaucracy.

Though findings from this study are only meant to be generalizable to those recreationalists at the sampled trailheads, it is the hope that the study’s framework can be applied by other public land management agencies to gain a greater understanding of the recreation groups that utilize their landscapes. By employing a broader range of constructs – place attachment, recreation specialization, and recreation motivation – managers are afforded the

opportunity to gain a broader understanding of the recreationalists that utilize their landscapes. It also allows them to set a number of management goals to work towards that address a wider range of goals amongst the groups. Oftentimes these goals might not be obtainable, but they can be continuously improved upon and are more defensible when challenged if they have a strong underpinning of scientific findings (Burns and Graefe 2006).

While there are indicators from the study that warrant future research, there are two main findings from this study that have practical management implications for OSMP managers. First, after collapsing the 11 Non-City of Boulder residency choices into one category (Non-Boulder) this group accounted for over 56 percent of the sample. Furthermore, when comparing City of Boulder with Non-Boulder residents, there were similar percentages of individuals being classified as having high place attachment to OSMP lands. Median scores for questions that fell within both the place identity and place dependence dimensions of place attachment was also similar. OSMP managers should be aware that OSMP lands are providing both the psychological and functional needs of not only its own community members but also visitors that are using OSMP lands for their recreational activities.

Boulder is increasingly becoming surrounded by bedroom communities for the Denver metropolitan area that are more affordable than Boulder and whose growth is not constricted by open space initiatives put forward decades ago. These communities are close enough that residents have the ability to take advantage of Boulder's OSMP lands. What this study indicates is that recreationalists in these and other communities are seeking out OSMP lands and OSMP managers should be aware of the fact that their locally managed lands are becoming a regional asset. Increasing number of visitors from outside communities could lead to conflicts between locals and visitors in terms of management decisions. Residents from the surrounding

communities may increasingly view themselves as stakeholders that should be brought to the table when local management decisions that may impact their recreational pursuits are made. Adding an extra layer of complexity to the management plans employed by OSMP managers. As usage from surrounding communities increases management decisions may need to be made that seek to balance the needs of the local community with those from surrounding communities.

Most funds used to acquire and manage OSMP lands are derived from a local sales tax and it could be argued that visitors to these areas have the ability to contribute to this fund through local purchases and as such should have a say in management decisions. However, if recreationalists from surrounding communities are simply free riding and not contributing funding to the acquisition or management of these landscapes a fee-based system for visitors may need to be employed to balance the impact to the resource they may be having. Some of the trailhead parking lots in the sample had fees for non-Boulder County residents, though there seemed to be lax enforcement of this rule, so stricter enforcement may need to be employed to ensure that visitors are indeed providing funds to OSMP.

Second, the top motivations to recreate on OSMP lands were overwhelmingly related to physical fitness and being in a natural environment, essentially nature-based recreation for physical health. There are endless opportunities for individuals to achieve their physical fitness goals including general and specialized gyms, apps on wireless devices, and home-based training systems that offer more convenience and a broader array of fitness-based infrastructure than natural landscapes. Though it is not known from this study if individuals are also using these options for their physical fitness goals, it is apparent from the results that OSMP lands are serving as a natural space where physical fitness can be obtained.

Protected areas such as OSMP lands are generally set aside for the preservation of natural ecosystems, providing protection from human development. There is broad community support for OSMP lands as witnessed by the continual passage of the local sales tax initiative to support these lands. However, managers at OSMP can use the initial results of this study to highlight the perceived public health benefits that the community is realizing from having these lands available to them for their recreational pursuits moving beyond the traditional landscape conservation framework that is generally employed to build support for natural places.

There is recognition that nature-based recreation has positive effects on physical health and emotional well-being as reviewed by Howland, Powell, Thomsen, and Monz (2018). Increasing numbers of communities that are sprouting up around OSMP lands present managers with a situation in which trails may become overly crowded losing some of their naturalness. A loss of naturalness may make these places not able to provide the nature-based physical fitness experiences that those in the study identified as a key motivation to recreate. Managers at OSMP, to further build support for the future acquisition and of OSMP lands, can use this loss of naturalness threat due to crowding to advocate for more lands in order to more effectively displace crowds across the landscape. Furthermore, OSMP land managers can work with local public health agencies when developing future management plans to ensure that the lands they manage become an asset for the physical and emotional well-being of the Boulder community.

This study adds to the recreation literature and is unique in two facets. First, a framework using place attachment, recreational specialization, and recreation motivation was developed and tested for a local land management agency. Second, the study took place at multiple trailheads and was conducted between multiple recreation groups that use these places. Overall this study recognizes that recreation groups on publicly managed landscapes are becoming more diverse

and more specialized making it necessary for recreation managers to employ a more diverse array of research methods to inform their management decisions. There is an ever-increasing set of challenges that land managers in general, but local land managers in particular, face when trying to meet the demands and needs of a heterogeneous group of recreationalists, particularly on multi-use trails that are being utilized by both the local and surrounding communities. The study's approach was uniquely tailored to Boulder's OSMP lands recognizing that the value of place-based research is that it should be employed with an understanding of local management needs. In that regard, this framework, when employed by different land management agencies, may likely produce different results but still allow for a more detailed understanding of the various recreation groups in that particular location. By using site-specific recreation specialization, place attachment, and motivation frameworks to study recreation users, managers can gain a greater understanding of how landscapes are defined and valued by those that use them for their recreational activities. It would also allow managers to understand what social, physical, and psychological attributes of different locations attract recreationalists to these places.

## Appendix

# RECREATION MOTIVATION



Boulder Open Space and Mountain Parks (OSMP) Department along with researchers from the University of Arizona are conducting a survey to try and gain a greater understanding of the motivations that recreationalists have for pursuing their recreational pursuits on OSMP managed

landscapes. Results from this survey will be used to inform OSMP management through incorporating a better understanding of perspectives from all recreation groups based on individual and group experiences. **Your participation in this survey is greatly appreciated.**

PLEASE PLACE AN "X" NEXT TO ONE BOX FOR EACH OF THE QUESTIONS BELOW

1. ARE YOU MALE OR FEMALE?

Male  Female

2. WHICH CATEGORY INCLUDES YOUR AGE?

18-20  21-29  30-39  40-49  30-39  40-49  50-59  60 or older

3. WHAT IS THE HIGHEST LEVEL OF SCHOOL YOU HAVE COMPLETED OR THE HIGHEST DEGREE YOU HAVE RECEIVED?

Less than a high school degree  High school degree or equivalent  
 Some college but no degree  Associate degree  
 Bachelor degree  Graduate Degree

4. WHICH OF THE FOLLOWING CATEGORIES BEST DESCRIBES YOUR EMPLOYMENT STATUS?

Employed full-time  Employed part-time  
 Not employed, looking for work  Not employed, not looking for work  
 Retired  Disabled, not able to work

5. HOW MUCH TOTAL COMBINED INCOME DO ALL MEMBERS OF YOUR HOUSEHOLD EARN ANNUALLY (PRE-TAX)?

Less than \$10,000  \$10,000 to \$25,000  \$25,000 to \$55,000  
 \$55,000 to \$100,000  \$100,000 or more

6. ARE YOU WHITE, BLACK OR AFRICAN AMERICAN, AMERICAN INDIAN OR ALASKAN NATIVE, ASIAN, NATIVE HAWAIIAN OR OTHER PACIFIC ISLANDER, OR SOME OTHER RACE?

White  Black or African American  American Indian or Alaskan Native  
 Asian  Native Hawaiian or other Pacific Islander  Multiple Races  Other

7. WHERE DO YOU LIVE?

Boulder (within city limits)  Unincorporated Boulder County  Other City in Boulder County  
 Longmont  Louisville  Lafayette  
 Superior  Metro Denver  Other areas in Colorado  
 Out of State  Out of Country

continued on next page

This section has to do with lands managed by OSMP and answers to these questions should be answered based on your recreational experiences on these lands.

PLEASE PLACE A CHECK IN THE BOX THAT CORRESPONDS TO YOUR LEVEL OF AGREEMENT FOR EACH OF THE QUESTIONS BELOW

	AGREEMENT				
	STRONGLY DISAGREE	SLIGHTLY DISAGREE	NEITHER AGREE OR DISAGREE	SLIGHTLY AGREE	STRONGLY AGREE
1. OSMP LANDS MEAN A LOT TO ME	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I IDENTIFY STRONGLY WITH OSMP LANDS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I FIND THAT A LOT OF MY LIFE IS ORGANIZED AROUND OSMP LANDS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. OSMP LANDS ARE A PART OF MY IDENTITY	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. RECREATING ON OSMP LANDS SAYS A LOT ABOUT WHO I AM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. THE TIME I SPEND ON OSMP LANDS COULD JUST AS EASILY BE SPENT SOMEWHERE ELSE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. OSMP LANDS ARE THE BEST PLACE FOR THE KIND OF RECREATION I LIKE TO DO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I ENJOY RECREATING ON OSMP LANDS MORE THAN ANY OTHER PLACE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I GET MORE SATISFACTION OUT OF VISITING OSMP LANDS THAN VISITING ANY OTHER PUBLICLY MANAGED LANDS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. RECREATING ON OSMP LANDS IS MORE IMPORTANT THAN RECREATING IN ANY OTHER PLACE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. I WOULD NOT SUBSTITUTE ANY OTHER PLACE FOR THE TYPE OF RECREATION I DO ON OSMP LANDS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. NO OTHER PUBLICLY MANAGED LANDS CAN COMPARE TO OSMP LANDS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. I WOULD ENJOY RECREATING IN ANOTHER PUBLICLY MANAGED LANDSCAPE JUST AS MUCH AS I DO ON OSMP LANDS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. ONE OF THE REASONS THAT I LIVE WHERE I LIVE IS BECAUSE OF OSMP MANAGED LANDS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

continued on next page



AGREEMENT

PLEASE PLACE AN "X" UNDER YOUR LEVEL OF AGREEMENT FOR EACH OF THE QUESTIONS BELOW

STRONGLY DISAGREE    SLIGHTLY DISAGREE    NEITHER AGREE OR DISAGREE    SLIGHTLY AGREE    STRONGLY AGREE

- 14. I FIND A LOT OF MY LIFE IS ORGANIZED AROUND MY CHOSEN RECREATION ACTIVITY
- 15. MOST OF MY FRIENDS ARE IN SOME WAY CONNECTED TO MY CHOSEN RECREATION ACTIVITY
- 16. I HAVE ACCUMULATED A LOT OF EQUIPMENT RELATED TO MY CHOSEN RECREATION ACTIVITY
- 17. I HAVE INVESTED A LOT OF MONEY IN EQUIPMENT RELATED TO MY CHOSEN RECREATION ACTIVITY
- 18. I FEEL I HAVE MORE EQUIPMENT THAN OTHER INDIVIDUALS THAT PARTICIPATE IN MY CHOSEN RECREATION ACTIVITY
- 19. I OFTEN SPEND TIME LEARNING ABOUT THE NEWEST EQUIPMENT AVAILABLE FOR MY CHOSEN RECREATION ACTIVITY
- 20. IN GENERAL, I AM OBTAINING MORE EQUIPMENT RELATED TO MY CHOSEN RECREATION ACTIVITY EACH YEAR

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PLEASE PLACE AN "X" NEXT TO THE CATEGORY THAT BEST CLASSIFIES YOU IN REGARDS TO YOUR CHOSEN RECREATION ACTIVITY

**Type 1:** My chosen recreation activity is enjoyable, but an infrequent activity that accompanies but is not a major part in other travel and outdoor interests. I am not highly skilled in my chosen recreation activity, rarely read about my chosen recreation activity, and do not own much equipment related to my chosen recreation activity beyond the basic necessities.

**Type 2:** My chosen recreation activity is important, but is not my exclusive outdoor activity. I occasionally read about my chosen recreation activity and purchase additional equipment to aid in acquiring more skill. My participation in my chosen recreation activity is inconsistent, and I would consider myself to have a moderate skill level.

**Type 3:** My chosen recreation activity is my primary outdoor activity. I purchase ever-increasing amounts of equipment to aid in acquiring more skill, participate in my chosen recreation activity every chance that I get, consider myself to be highly skilled, and frequently read about my chosen recreation activity.

1. PLEASE SELECT YOUR PRIMARY MOTIVATION FOR PURSUING YOUR CHOSEN RECREATION ACTIVITY ON OSMP LANDS. (PLEASE ONLY SELECT ONE)

- To develop abilities
- To show others my abilities
- To be close to nature
- For relaxation
- To develop physical skills
- For physical fitness
- To use my mind
- To develop friendships
- To enjoy nature
- For personal values
- To seek solitude
- For accomplishment
- For photography/art
- For competition
- To view scenery
- To disengage from the world
- For personal testing
- For exhilaration
- For self-expression

1. ARE THERE ANY EDUCATION PROGRAMS THAT YOU BELIEVE OSMP COULD OFFER TO HELP YOU DEVELOP YOUR SKILL LEVEL IN YOUR CHOSEN RECREATION ACTIVITY?

end of survey

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