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UNCONFINED WILDERNESS EXPERIENCES: WHAT IS IMPORTANT TO FEELING UNCONFINED WHILE VISITING THE SELWAY-BITTERROOT WILDERNESS?

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WHAT IS IMPORTANT TO FEELING UNCONFINED WHILE VISITING THE SELWAY-BITTERROOT WILDERNESS?

By

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Unconfined Wilderness Experiences: What is important to feeling unconfined while visiting the Selway-Bitterroot Wilderness?

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Abstract
The principal aim of this study was to increase our understanding of an "unconfined type of recreation". This management objective is mandated by the Wilderness Act of 1964 and has received little empirical focus within visitor experience research. A 20-item survey research scale was developed and found to be valid and reliable when considering what is important to feeling unconfined in the Selway-Bitterroot Wilderness of Idaho and Montana. The scale included four components or factors that were labeled, "Free Choice", "Untethering from Responsibility", "Making Own Plans", and "Exploring". In addition, the Perceived Freedom in Leisure Scale was administered and showed that the majority of respondents display high leisure functioning. Three clusters of respondents were formed based on the 20-item unconfined component scores, but these groups were not found to differ by any trip or visitor characteristic. Therefore, when agencies manage for outstanding opportunities for an unconfined type of recreation they should not target any one type of wilderness visitor or trip characteristic.

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Chapter 1 Introduction

1.0 - Introduction

The National Wilderness Preservation System (NWPS) was created in 1964 through the passage of the Wilderness Act (Public Law 88-577). The law protected 9.1 million acres of land as wilderness and developed a legal framework for the creation of future wilderness areas (Allin, 1982; Wilderness Act, 1964). Since 1964, the NWPS has grown to nearly 110 million acres across 765 wilderness areas managed by the United States Forest Service (USFS), the National Park Service, the United States Fish and Wildlife Service, and the Bureau of Land Management (Wilderness.net, 2017). This growth speaks to the importance of wilderness areas to the American people and is a great success story of public land preservation.

The federal land management agencies responsible for wilderness stewardship play a critical role in fulfilling the Wilderness Act's mandate to preserve wilderness character. Wilderness character is composed of distinct and interrelated "qualities" that are meant to connect on-the-ground conditions, stewardship activities, and the statutory language of the law (Dvorak, 2015; Landres et al., 2015). One quality of wilderness character encompasses the type of experiences wilderness should provide: "outstanding opportunities for solitude or a primitive and unconfined type of recreation" (Landres et al., 2015; Wilderness Act, 1964).

Understanding how setting attributes influence the nature of visitor experiences in wilderness areas is critical to effective management (Cole & Hall, 2009). One of the most basic tenets of outdoor recreation management is that the conditions or settings experienced directly affect the quality of a visitor's experience (Driver & Brown, 1978). Extensive research has been conducted on the nature of solitude in wilderness. Many studies have measured the number of encounters visitors experience as an attempt to understand solitude and the wilderness

experience. Researchers have also looked at the notion of primitiveness in relation to the wilderness experience (Borrie, 2004). Few researchers, though, have explored the concept of an unconfined type of recreation (Shafer, 1993, McCool, 2004, Landres et al., 2015). This may be because it is one of the more ambiguous terms contained in the Wilderness Act. But because it was not extensively discussed by Congress does not reduce its importance as a dimension of the wilderness experience. Certainly, Congress would not have included it as one of the central opportunities provided by wilderness areas if it were not important (McCool, 2004).

1.1 – Conceptual Definitions of Unconfined Type of Recreation

As little research has attempted to extract a definition of unconfined type of recreation experiences from wilderness visitors we must turn to other sources for understanding. The few researchers who have addressed the subject interpret unconfined to be the antonym of the word confine (McCool, 2004; Shafer, 1993). Perhaps, the most easily accessible source for definition then comes from the dictionary (Merriam-Webster Inc., 1985). Confine is "to set bounds, to restrain within limits, to restrict, to limit, to shut up, to enclose, to keep close." We may also infer that there is a depravation of freedom (McCool, 2004). An unconfined recreation opportunity is one that is unbounded, unlimited, and untrammeled. The recreation experience would be unrestricted and a visitor, for instance, would enjoy the freedom to travel where they want, camp where they want, and determine their length of stay in any given location. The visitor would not be restricted access to certain areas, and they could build campfires where they felt conditions or location allowed it.

Unsatisfied with a definition coming from a dictionary, it is also beneficial to consider the writings of those who championed the National Wilderness Preservation System. In Robert Marshall's essay *The People's Forest* (1933), Marshall comments on the value of recreation in

wilderness and that too often people are confined to the roads and that they should follow their curiosity to find out what lies beyond. Marshall valued the forest and wilderness areas immensely and writes "As society becomes more and more mechanized, it will be more and more difficult for many people to stand the nervous strain, the high pressure, and the drabness of their lives. To escape these abominations, constantly growing numbers will seek the primitive for the finest features of life" (Marshall, 1933, p. 65). Marshall (1933) also states that roads acted as a form of confinement for most recreationists in that people seemed unable to escape their car to explore true wilderness (As cited in Shafer, 1993). We may infer from Marshall's statements that freedom of travel and exploration was important to his conception of unconfined experiences in wilderness.

In his dissertation Engebretson (2017) discusses the meanings of the phrase "solitude or a primitive and unconfined type recreation", as understood by the authors of the act and lawmakers at the time, using historical documents related to the passage of the Wilderness Act. Based on his review of congressional hearings the term "unconfined" was not used illustratively in the hearings and only referenced in the specific language of the associated proposed bills (Engebretson, 2017).

Engebreston (2017) writes further,

> "However, Zahniser provided some material as evidence in the hearings from which his thinking may be inferred. Specifically, he included a discussion of the potential need to ration use in wilderness areas in his response to the LRS survey. He wrote that it was paramount to "give the maximum number of individuals a true wilderness experience, with emphasis on the authenticity of the wilderness" (NWPA Hearings, 1957e, p. 193). To him, a "true wilderness experience" was threatened by excessive numbers of people. Related to how unconfined is understood today as a lack of visitor restrictions (e.g., Landres et al., 2015; McCool, 2004), he described a manager's dilemma of limiting the number of users in wilderness or imposing strict rules on visitor behavior."

All of the discussion surrounding unconfined type of recreation experiences suggests a need for further exploration of this important phrase. The previous research on the subject

suggests that it may relate to regulations imposed on the visitor but may also include aspects of free choice, determining your own plans, and exploration away from the automobile in natural areas free from the influence of modern man.

1.2 – Research Purpose

In an attempt to further our understanding of the nature of wilderness experiences this research will focus solely on opportunities for an unconfined type of recreation. As stated, it is assumed that recreation setting attributes have the ability to influence the visitor experience in general, as well as opportunities for unconfined type of recreation experiences. One purpose of this research is to consider setting attributes perceived to be important for the opportunity to have unconfined type of recreation experiences. Likewise, if importance of setting attributes related to unconfined experiences can be determined through visitor evaluation, it would be beneficial to measure satisfaction or performance of those setting attributes in an attempt to determine if opportunities for unconfined experiences are being achieved.

Yet environmental, managerial, and social setting attributes may not be the only factors important to achieving unconfined type of recreation experiences while in wilderness areas. As with other wilderness studies, which have attempted to define and measure constructs such as solitude, it would be beneficial to explore the underlying dimensions of unconfined type of recreation experiences. The development of a scale which captures the underlying dimensions of unconfined type of recreation experiences becomes another important goal of this study.

A third objective of this study is administering the Perceived Freedom in Leisure (PFL) Scale. As will be discussed throughout this study, freedom and unconfined are conceptually similar. The administration of this scale to wilderness visitors would be a novel application of

this instrument and may provide insights into the leisure functioning of wilderness visitors and if leisure functioning relates to unconfined type of recreation experiences.

1.3 – Problem Statement

The issue of why it is so important to research unconfined type of recreation concerns more than just semantics. Yet, semantics are important. As wilderness stewards we must strive to understand the conceptual semantics or cognitive structure of meaning of the phrase, "unconfined type of recreation". However, it goes beyond semantics and is also more than its inclusion in the Wilderness Act which justifies an examination of this phrase. It relates to the nature of the wilderness experience and the character of wilderness. We have focused a great deal of energy, time, and resources on researching the concept of solitude. As a field, we have focused on this word for decades, what it means to the visitor, how it shapes their experience, and how we can manage wilderness to provide outstanding opportunities for this part of the wilderness experience. As a result of the exceptional research done on solitude we have developed management policy for wilderness which attempts to fully fulfill this part of the mandate of the Wilderness Act. These policies have implications which affect visitor experiences in wilderness and have the potential to frame or shape wilderness character. These policies and management practices also affect the meaning we give to wilderness areas and thus, how we experience them. The research focused on solitude has preserved opportunities for this integral dimension of the wilderness experience, partly through the development of indicators which managers can monitor to preserve and protect opportunities to experience solitude. We know, for instance, that solitude is not simply being alone in the wilderness, and cannot be measured simply by counting the encounters visitors have with other visitors (Hammit, 1982).

Yet the same cannot be said for an unconfined type of recreation. As a field we have not devoted the same time and attention to either the semantics of unconfined, nor to developing sound management policy which preserve opportunities for this dimension of the wilderness experience. We have not tested the variety of setting attributes and associated indicators which may be important to unconfined type of recreation. The research is so lacking on unconfined type of recreation we assume that this dimension of the experience can be quantified by setting attribute indicators as with other qualities of wilderness character. As a field, and as managers, we are assuming that when we monitor the character of wilderness, the quality of unconfined type of recreation can be measured by a sole indicator: number of management restrictions on visitor behavior. There may be other indicators which have the potential to shape policy which are more appropriate and relevant to an unconfined type of recreation. This research is an attempt to explore the underlying dimensions of unconfined type of recreation experiences through scale development. It may help illuminate whether current management frameworks, such as the Wilderness Character Monitoring (WCM) program, are using appropriate indicators to quantify unconfined type of recreation.

1.4 - Research Questions

If wilderness areas are to provide outstanding opportunities for an unconfined type of recreation experience, and setting attributes effect experiences, it would benefit wilderness managers to identify indicators to monitor threats to this dimension of the experience. The questions this research will attempt to address are:

1.) What setting attributes influence the opportunity to have unconfined type of recreation experiences?

2.) What setting attributes are most important to the opportunity to have an unconfined wilderness experience?

3.) Are the indicators chosen valid measures of outstanding opportunities for unconfined type of recreation experiences?

4.) Does variation in perceived freedom in leisure influence the importance ratings of particular setting attributes?

5.) Does age, mode of travel, or previous wilderness experience determine visitor preferences for conditions as they relate to unconfined wilderness experiences?

6.) Is the conceptual model presented in chapter 2 an accurate description of the relationships between PFL scores, visitor and trip characteristics, setting attributes, and the importance and performance of setting attributes?

The following chapters present a review of the literature used for the development of the conceptual foundation for the study and scale items. A theoretical model based on previous research will be presented. Following the literature review, chapter three presents the study area, the details concerning the survey, and the methods used to collect and analyze the data. Chapter four presents the results of the survey, while chapter five presents the statistical analysis performed on the data collected. The final chapter discusses implications of the findings and opportunities for future research.

Chapter 2 Literature Review

The following chapter presents the literature review in order to frame the context of the research and to identify gaps in wilderness research. The theoretical model used to guide the research will be presented and discussed first. The literature review then focuses on the Wilderness Act of 1964 and foundational recreation management frameworks that have contributed to our understanding of the wilderness experience. The review then discusses setting attributes and indicator selection relevant to the research questions. Guidelines to determine the importance and performance of setting attributes are reviewed followed by discussion of the intermediary variable in the theoretical model, the PFL scale.

2.1 - Theoretical Model

To assess the research questions, it is helpful to use a conceptual model that illustrates the possible relationships among five possible assessment domains: setting attributes (conditions in wilderness area), importance of setting attributes, performance of setting attributes, perceived freedom in leisure, and visitor experience. One objective of this study is to extend research into the effect of setting attributes on unconfined experiences. That is, experience is hypothesized to be influenced by the setting attributes or conditions experienced, and some setting attributes may be important to unconfined experiences. However, if the performance of setting attributes such as being able to camp out of sight of other people is low, the quality of an unconfined wilderness experience is likely to suffer as a result.

Setting attributes are the conditions that visitors experience while on a wilderness trip and, thus, affect the opportunities for unconfined type of recreation experiences. These are treated as the independent variables. Within these setting attributes (objective conditions) there are three relevant categories; environmental, social, and managerial. Most common environmental

conditions are beyond managerial control while many social setting attributes can be controlled. That is, environmental conditions such as weather, bugs, and smoke from fires cannot be controlled by managers and yet often influence the experience. A rainy, buggy wilderness trip may be less desirable than one with clear weather and no bugs, but a manager has no control over environmental setting attributes (objective conditions) such as these. Social attributes such as amount of use, or type of visitor activity are examples that managers have a high degree of control over. Managerial attributes are clearly dictated by managers and include imposed conditions such as zoning for different activities and behavioral regulations such as campfire restrictions. This study seeks to understand which setting attributes may be important to feeling unconfined while in wilderness.

Visitor experience refers to what visitors do in the wilderness, how they feel when they are there, and what they think about (Cole, 2004). This research is interested in visitor evaluations of setting attributes and perceived freedom in leisure in a wilderness setting and how the two may interact. Additionally, certain setting attributes may be more important than others to achieving unconfined experiences. In addition to setting attributes, the visitor's perceived freedom is hypothesized to influence the evaluation of setting attributes. This concept is exemplified by differing people encountering the same setting attributes but having very different experiences (Cole, 2004).

The conceptual model is presented below in figure 1. Arrows represent relationships between the variables and how the independent variables are thought to have an effect on the dependent variables.

Setting attributes (objective conditions) are included in the model and these vary from wilderness to wilderness but as stated, managers have some degree of control over these. It is

posited that certain setting attributes (objective conditions) have greater influence on opportunities for unconfined type of recreation experiences necessitating their inclusion in the model. In essence, the importance and performance evaluations of setting attributes by individuals follow from these objective conditions. Visitor evaluations of importance of setting attributes is included as a component in the model because these are hypothesized to vary from individual to individual. If certain setting attributes (objective conditions) are evaluated as having high importance for opportunities for experiences across individuals, these setting attributes are determined to be important for opportunities for unconfined type of recreation experiences. An individual's PFL score is hypothesized to influence the importance an individual places on certain setting attributes and is treated as an intermediary independent variable in the model. For example, an individual who scores as having a high perceived freedom in leisure may place more importance on the setting attribute of freedom to camp out of sight and sound of others which may be an indicator of the opportunity for an unconfined type of recreation experience.

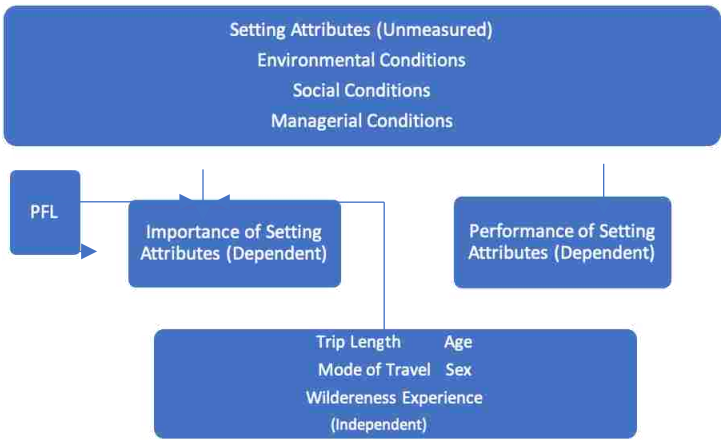


Figure 1.1: Conceptual Model of the relationships between setting attributes, perceived freedom in leisure score, importance of setting attributes, performance of setting attributes, and wilderness experience. (Modified from Cole, 2004).

To address research questions 1 and 2, visitors will be asked to rate the importance of setting attribute indicators to their opportunity to have unconfined type of recreation experiences. To address research question 3, indicators will be selected for the three dimensions of setting attributes. Importance/Performance scores for setting attributes will be based on these indicators revealing if the indicators selected are valid measures of opportunities for unconfined type of recreation experiences. To address research question 4, the PFL scale will be administered as part of the survey to determine if differences in perceived freedom in leisure effects the evaluations of various setting attributes. To address research question 5, visitor and trip type variables will be measured and an unconfined wilderness experience scale will be developed. To address research question 6, analysis will be performed using MANOVA and ANOVA procedures to determine if differences exist between the independent and dependent variables presented in the model.

2.2 - The Wilderness Act of 1964

The Wilderness Act of 1964 is the principle document guiding those who administer federally designated wilderness areas in the United States. Managers of wilderness are clearly to provide opportunities for high-quality recreation experiences from the definition of wilderness in the National Wilderness Preservation System which is:

> "an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation" (PL 88-577, Sec 2(c)).

We see that certain types of opportunities for experiences are to be provided and protected and that these experiences are defined by the three descriptors “solitude”, “primitive recreation”, and “unconfined recreation”. In the Wilderness Act, primitive and unconfined type of recreation is one phrase, but the separation of primitive recreation and unconfined type of recreation is somewhat justified by the mention of primeval character earlier in Section 2(c). Primeval character is preserved by, and refers to, primitive forms of travel and living, denoting it as a separate dimension of the wilderness experience. We are not however, given further explanation of unconfined in the language of the Wilderness Act.

2.3 - Freedom, Unconfined, and Interpreting the Wilderness Act

What did the authors of the Wilderness Act mean by outstanding opportunities for solitude or a primitive and unconfined type of recreation? As mentioned in chapter one, Engebretson (2017) researched the legislative hearings preceding the passage of the Wilderness Act in order to interpret the meaning of the phrasing used by the authors. He argues that interpretation of the definition of wilderness by managers and academics to date has largely ignored the historical texts most directly related to the development of the Wilderness Act. These texts are important to better understand the historical intent behind the phrase and language used in the Act (Engebretson, 2017). Howard Zahniser was the head of the Wilderness Society and editor of the Living Wilderness from 1945 to 1964. He is arguably the person most responsible for drafting and promoting the Wilderness Act. Although unconfined was not discussed at length in congressional hearings, Engebretson posits that Zahniser held a nuanced view on regulations in the wilderness and felt that the true wilderness experience was largely devoid of regulations (Engebretson, 2017). Connecting this to how unconfined is understood by a lack of visitor regulations today (Landres et al., 2015; McCool, 2004) Zahniser felt that:

> Eventually it may be that wilderness use will have to be rationed. This would seem to be the alternative to administering the wilderness for the accommodations of large numbers of people at a time, which would jeopardize the wilderness itself and the wilderness "atmosphere" and at the same time would require regulation or regimentation of the visitors in such a way as to destroy the "freedom of the wilderness" and to nullify the escape from restrictions that is so important a part of the wilderness experience. (NWPA Hearings, 1957, p. 193)

We can infer that freedom was an important concept to Zahniser and escape from restrictions was important in achieving a wilderness experience. Too many restrictions posed a threat to Zahniser's concept of "freedom of the wilderness" and authentic wilderness experiences (Engebretson 2017).

When attempting to understand the influence of setting attributes on opportunities for unconfined recreation experiences and how these attributes could be used as indicators within a planning framework it is essential to review a few of the frameworks that have shaped past recreation research. These frameworks establish important imperatives for recreation resource managers and help frame this research proposal. The two most relevant frameworks to this research are Wilderness Character Monitoring and the Limits of Acceptable Change planning framework.

2.3 – Wilderness Character Monitoring

Wilderness Character Monitoring is a framework that has been developed to prioritize research on threats to wilderness character throughout the National Wilderness Preservation System. One of the central directives of the Wilderness Act of 1964 is that "each agency administering any area as wilderness shall be responsible for preserving the wilderness character of the area" (Landres et al., 2005). Wilderness Character Monitoring (WCM), is intended to "lay the conceptual foundation for selecting and monitoring indicators of conditions and actions

related to wilderness character" (Landres et al., 2005 p iii). In addressing why a framework needed development, Landres et al. (2005) state that many wilderness program and field managers perceive a steady erosion of wilderness character but there is no framework for identifying and describing this loss. There is also no means for measuring the positive outcomes from stewardship activities and decisions. WCM aims to develop a national core set of indicators that can be monitored to allow compilation of information at the local, regional and, federal levels surrounding wilderness character (Landres et al., 2005). One important concept that WCM attempts to articulate and has been debated is what wilderness character means. By more clearly stating what wilderness character is, and what is meant by wilderness character, the authors provide managers of wilderness areas with direction on how to monitor and uphold mandates set forth in the Wilderness Act.

The authors of the WCM framework use section 2(c) of the Wilderness Act to guide the qualities of wilderness character to be monitored. They identify four qualities from this section that helps lay the foundation for WCM. The four qualities are "untrammeled", "natural", "undeveloped", and "opportunities for solitude or a primitive and unconfined type of recreation". These qualities are applicable to all wilderness areas regardless of managing agency, size, location, or other site-specific features because they are based on the legal definition of wilderness (Landres et al., 2008). Additionally, all four qualities are considered equally important and none are weighted more or less important than others (Landres et al., 2005). The most relevant of these qualities to this study is the last, "opportunities for solitude or a primitive and unconfined type of recreation" and will be the only quality discussed in this literature review.

When discussing the quality of wilderness character "Solitude or a primitive and unconfined type of recreation", the WCM framework does not attempt to understand or measure visitor experiences concerning this quality but attempts to monitor threats to solitude or primitive and unconfined experiences. This quality is degraded by settings that reduce these opportunities, for example high visitor encounters, signs of modern civilization recreation facilities and management restrictions on visitor behavior while in wilderness areas (Landres et al., 2008). As these were central to the definition of wilderness in the Act these concepts have been debated and researched extensively.

The meaning of solitude is largely considered as a lack of encounters with other visitors (Landres et al., 2008), but also has been viewed in terms of privacy from others where visitors have control over whether they choose to interact with other visitors (Hammit, 1982). The developers of the WCM framework prudently take these conceptualizations into account but also refer to early wilderness writers. They interpret solitude more holistically and in its historical context at the time the act was being written. Solitude, then, encompasses attributes of separation from people and civilization, inspiration or a connection with the beauty of nature and the larger community of life, and a sense of timelessness (Landres et al., 2008).

The meaning of primitive and an unconfined type of recreation has received less treatment by researchers and academics than solitude but is important to wilderness character. Primitive recreation primarily concerns non-motorized, non-mechanized forms of travel that connect us to early American heritage (Landres et al., 2008). Roggenbuck (2004) posits that primitive recreation also embodies self-reliance and personal skills. Unconfined encompasses attributes such as self-discovery, exploration, and freedom from societal or managerial controls (Hendee & Dawson, 2002; Lucas, 1983; Nash, 1996). Often, protecting these qualities puts

managers in situations where the need for resource protection is at odds with opportunities for solitude or primitive and unconfined recreation resulting in difficult decisions (Landres et al., 2008). Because of the complex nature of the concepts and their influence on human experiences while in the wilderness many different factors contribute to the experience of solitude or a primitive and unconfined type of recreation making monitoring these qualities more complex. The authors note that when monitoring this quality, they do not intend to understand visitor experiences or perceptions but instead are focusing on the outstanding opportunities for these experiences and to monitor how opportunities are changing over time (Landres et al., 2008).

"Monitoring this quality focuses exclusively on assessing how the opportunities for people to experience wilderness is [sic] changing, not on how visitor experiences are changing" (Landres et al., 2008, p. 28). They argue that these qualities of wilderness character are degraded by settings that reduce these opportunities such as management restriction on behavior, encounters with other wilderness visitors, signs of modern civilization and facilities provided by the agency that decrease self-reliance (Landres et al., 2008).

Wilderness Character Monitoring has become influential in how managers of wilderness use indicators to monitor wilderness character and opportunities to have certain experiences in wilderness areas. It is relevant to this study because the indicators used to monitor opportunities for unconfined type of recreation experiences are primarily concerned with restrictions imposed on the visitor and managerial setting attributes. This study seeks to explore whether these are the most relevant indicators for the opportunity to have unconfined experiences and will purposefully explore other indicators and setting attributes which may also be of importance.

Another framework relevant to framing this research proposal is the Limits of Acceptable Change planning framework. This framework was a response (among other things)

to criticisms and limitations of the concept of recreation carrying capacity. This framework uses indicators to monitor wilderness setting attributes and establishes standards for setting attributes. If standards are not met as measured by indicators, then some restriction is placed on the resource or social conditions to bring attributes back into standard. Further discussion of the Limits of Acceptable Change planning framework will follow.

2.4 - Limits of Acceptable Change

Limits of Acceptable Change (LAC) was a planning process developed in the early 1980's in response to the General Authorities Act (PL 95-625) and the National Forest Management Act of 1976 (PL 94-588) requiring protected area managers to establish recreation carrying capacity limits to be incorporated into forest planning (Cole & Stankey, 1997). Additionally, LAC was developed to address managers growing concerns about the continued increase of recreation use in protected areas and the impacts of that use. "In his master's thesis on campsites in the Boundary Waters Canoe Area, Frissell (1963) concluded that if recreation use is to be allowed, deterioration is inevitable and must be accepted" (Cole & Stankey, 1997, p.6). LAC acknowledged this inevitable deterioration but sought to develop a monitoring system that could measure and monitor those impacts. It also developed standards to which deterioration could not pass without incurring management actions to prevent further decline. That is, there is a limit of what is considered acceptable change in conditions. However, the developers of LAC recognized "that amount of use was only one of many variables that influence the quality of visitor experiences and environmental conditions" (Cole & Stankey, 1997, p. 6). Cole and Stankey (1997) identify that mode of travel, group size and behavior, environmental variables, and management actions all influence visitor experiences, and that management strategies that manipulate these variables are better options than actions that limit use. Because Congress

mandated that federal land managers establish and monitor carrying capacities (PL 94-588), a framework that incorporated the principles, concepts, and findings of carrying capacity research was needed. There are nine steps in the LAC process, the first consisting of identifying the area's concerns and issues. These issues will aid in the selection of indicators in step three of the LAC process and are discussed later in the literature review on the selection of indicators for this research. Step 2 requires planners to define and describe opportunity classes. In this step, existing conditions are described and analyzed (Cole & McCool, 1997). Also, a part of this step is defining what conditions will be allowed to exist in this opportunity class or "zone". These conditions are not desired conditions because of the realization that compromise will inevitably occur. To explain, the definition of conditions that will be allowed to exist is the most amount of impact allowed to occur in the area, instead of the desired conditions present if no impact was present or allowed. The 3rd step is the selection of indicators of setting attributes. These will vary from area to area, but common indicators may include number of campsites in an area, number of encounters, and amount of litter and so on. Indicators measure the perceptions of experiences and not an element of the setting. For example, "number of campsites" is not an element of the setting but more an indicator of the opportunity to camp out of sight and sound of others. The fourth step in the process is to inventory existing resource and social conditions. This step is vital in the application of LAC, it provides the baseline data for which level of impact is measured against or success of management action in restoring an area back to acceptable conditions. It must be noted that this inventory may not be acceptable to start with, an important consideration for managers. After resource and social conditions have been inventoried standards must be specified for environmental and social indicators. "Standards define minimally acceptable conditions" (Cole & McCool, 1997, p, 63). Standards specify the difference from desired

conditions that has been accepted to avoid compromising another goal (Cole & McCool, 1997). Standards are set by which the area cannot be changed further without compromising another goal (unrestricted access/recreational use). Step 6 in the LAC planning process is to identify alternative opportunity class allocations. Step 7 identifies management actions for each alternative. This does not mean simply listing all possible management actions. Rather managers need to identify specific management actions to bring standards into compliance (Stankey, Cole, Lucas, Petersen, & Frissell, 1985). Step 8 requires managers evaluate and select an alternative resulting from step 7. Finally, in step 9 managers implement actions and continue to monitor conditions. This is the specific process of the LAC planning system. Since indicators and standards are central to the LAC process and environmental, social, and managerial setting attributes can be used to indicate the quality of the wilderness recreation experience a review of the criteria of good indicators is necessary.

2.5 - Indicator Selection and Criteria

Indicators are intended to distill a large amount of information about the setting attributes while still retaining enough information to help guide management decisions (Ott, 1978). No one indicator can measure the overall quality of a wilderness experience and managers cannot monitor every setting attribute, concluding that choosing good indicators becomes increasingly important (Merigliano, 1990). If setting attributes (conditions) influence outstanding opportunities for unconfined type experiences an indicator when compared with standards set for limits of acceptable change "can signal the need for corrective action and evaluate the effectiveness of various management actions" (Merigliano, 1990, p. 157). Indicators provide quantitative documentation on whether setting attributes (conditions) are providing opportunities for certain experiences. It must be noted that indicators are typically tied to a specific quality of

the wilderness experience. For example, the indicator, "number of encounters" may measure opportunities for solitude. Merigliano (1987, 1990) developed nine criteria that can be used to guide indicator selection and notes that these criteria can be "weighted in terms of importance to managers to tailor selection for a particular wilderness area" (p. 157). The nine criteria for good indicators developed by Merigliano:

Table 2.1: Indicator Criteria guiding Indicator Selection

Quantitative	Can the indicator be enumerated?
Correlation	Does the indicator detect a change in conditions caused by human activities?
Feasible	Can the indicator be measured by field personnel using simple equipment and techniques?
Reliable	Can the indicator be measured reliably?
Responsive	Does the indicator detect a change in conditions which is responsive to management control?
Sensitive	Can the indicator detect a change in conditions which occurs in one year?
Integration	Does the indicator reflect the condition of more than itself?
Early warning	Does the indicator act as an early warning alerting managers to deteriorating conditions before unacceptable changes occur?
Significance	Does the indicator detect a change in conditions which persists for a long time (e.g. 5 years) disrupts ecosystem functioning, or reduce the future desirability of the area to visitors?

Several research studies have attempted to identify potential indicators of the quality of wilderness experiences (Merigliano, 1990; Shelby & Shindler, 1992; Whitaker, 1992; Roggenbuck et al., 1993; Shafer and Hammitt, 1994; Manning et al., 1995a, 1995b, 1996; Manning & Lime, 1996; Jacobi et al., 1996, Glaspell et al., 2003). There are five general conclusions that might be derived from these study findings, the first being potential indicators of quality can be wide ranging (Manning & Lime, 2000). This suggests that all three setting attributes (environmental, social, and managerial) should be included when thinking about potential indicators. That is, multiple indicators should be monitored to address all three categories of setting attributes. Second, in defining the quality of the recreation experience, many potential indicators rate as at least somewhat important (Manning & Lime, 2000). Third, many of

these studies have found that some indicators are more important than other indicators of the quality of the wilderness experience (Manning & Lime, 2000). However, different studies have used different criteria for evaluating indicator importance. Fourth, wilderness visitors may be more sensitive to potential indicators of quality than visitors of more developed areas (Manning & Lime, 2000). This suggests that wilderness visitors may be more reliable in determining which indicators to use. This may be because wilderness visitors are generally more specialized or sensitive and have clearer ideas about what is important to achieving the goals of their experience. Finally, "for wilderness campsites, social indicators of quality may be generally more important than ecological indicators" (Manning & Lime, 2000, p. 21). In sum choosing indicators has received much attention in wilderness recreation research and choosing good indicators is important to the success of management frameworks such as LAC and WCM. These criteria are taken into account in choosing indicators for this research proposal.

2.6 - Setting Attributes and Indicators

Cole and Hall (2009) note that the foundation of many of the most influential and widely used recreation management frameworks such as the Recreation Opportunity Spectrum (ROS) (Driver et al., 1982), Limits of Acceptable Change (LAC) (Stankey et al., 1985) and Visitor Experience and Resource Protection (VERP) (Manning, 2001) is in managing the setting to influence experience opportunities. In each of these frameworks it is necessary to identify setting attributes that influence experience quality. Past studies have approached the problem of selecting indicators using a number of methods including qualitative, quantitative or a combination of both. The indicators themselves aren't qualitative per se, but some studies have used interviews to understand the effects of specific attributes on experiences (Farrell et al., 2001; White, 2007). Others have attempted to develop indicators based on insights gleaned from

interviews (Glaspell et al., 2003, Watson et al., 2007). Some have attempted to "identify experiential indicators through empirical research on the effects of setting attributes (environmental, social, and managerial) on the visitor experience" (Cole & Hall, 2009, p. 25). They go on to note, "in early studies visitors were typically asked to evaluate the degree to which various attributes (the number of visitors, the quality of trails, number of regulations etc.) affected their experience" (Cole & Hall, 2009, p.25). By using this approach, the participants can only evaluate the conditions they experienced while on their trip leading to problems that a potentially important indicator may be overlooked because it is currently not a problem, or that visitors weren't looking for these sorts of problems. (Cole & Hall, 2009). This is not to say the indicator itself was a problem, but the conditions were not a problem and so were not noticed or influential for visitors. For example, if an indicator of opportunities for unconfined recreation experiences is the amount of restriction management places on travel, and there are no restrictions placed on travel then this indicator may be overlooked or a conclusion reached that restrictions on travel are not a problem. Subsequent studies have attempted to bypass this problem by operating in the hypothetical and ask generally how much influence various attributes might have on experience quality. "Visitors are asked to evaluate the importance of different attributes, regardless of whether they were problematic on their recent wilderness visit" (Cole & Hall, 2009, p. 25). In theory these responses should not depend much on the conditions experienced on their trip. Cole and Hall (2009) further note that this still presents problems because of difference in what visitors consider possible. "For example, divergent responses regarding the importance of number of hiking groups might reflect one person envisioning meeting 10 other groups and someone else envisioning 1000 groups" (Cole & Hall, 2009, p. 25). This research proposal follows Cole and Hall's (2009) approach to overcoming these limitations

by maintaining a hypothetical approach when asking about the importance of conditions to the visitor's opportunity to have an unconfined wilderness experience.

As noted, setting attributes (conditions) can be grouped into three categories, the biophysical or environmental, social, and managerial. All three categories have the potential to contribute to or detract from the quality of the wilderness experience and indicators of each can be identified (Merigliano, 1990). Environmental setting attributes that have been found to contribute to the quality of experience include presence of wildlife, streams, clean water, wide views, rugged terrain, trail-less areas, and remote lakes (Manfredo et al., 1983; Lucas, 1980). Environmental attributes that have been found to detract from the wilderness experience are campsite vegetation and soil impacts, presence of domestic animals, trail deterioration, and structures (Manfredo et al., 1983; Hoover et al., 1985, Lucas, 1985). Social setting attributes have largely been concerned with encounters and evidence of other groups and behavior. Campsite privacy has been shown to be very important to achieving a quality wilderness experience (Lucas, 1985; Stankey & McCool, 1984). Contacting other groups has also been shown to detract from the wilderness experience (Manfredo et al., 1983). Managerial setting attributes that add to the visitor's experience include restrictions on domestic livestock, leave no trace information dissemination, restrictions on outfitters, restrictions on groups size and restoration activities. Trails in good condition and bridges have also been shown to enhance to quality of experience (Manfredo et al., 1983; Lucas, 1980, 1985). Managerial settings that detract from the visitor's experience include restrictions on visitor use and route selection, and developments in wilderness areas (Manfredo et al., 1983; Lucas, 1985).

Manning (2011) conducted a review on a number of studies that focused on identifying potential indicators of quality wilderness experiences. This review was informative when

choosing indicators to be used in this research proposal. For example, Lawson and Manning (2002) developed a list of potential setting attributes for measurement in the Denali wilderness. They selected 6 wilderness setting attributes to define the social, environmental, and management conditions. The setting attribute indicators addressing the social conditions included number of groups encountered per day while hiking and opportunity to camp out of sight and sound of other groups (Lawson & Manning, 2002). Two setting attribute indicators related to environmental conditions in wilderness were character of hiking trails and signs of use at camping sites (Lawson & Manning, 2002). Setting attribute indicators reflecting management conditions were regulation of camping, and the difficulty in obtaining a permit for overnight trips (Lawson & Manning, 2002). Lawson and Manning (2002) is one example of numerous studies using indicators to measure the quality of experiences. Many other studies have identified other indicators that this research proposal may use to identify indicators which may potentially influence opportunities for unconfined type of recreation experiences.

Glaspell et al., (2003) also looked at selecting indicators in Gates of the Arctic National Park and Nunavut National Park. Through these qualitative interviews, 5 dimensions of the experience were identified. Glaspell et al., (2003) write “Like solitude, relative freedom from management influence (“unconfined recreation”) is often interpreted from the Wilderness Act as an important element of wilderness experiences” (p. 65). Results from the qualitative interview section of their study did indeed identify this as an important element in the wilderness experience. Glaspell et al.,(2003) remark that “visitors enjoyed the lack of access restrictions, and their many opportunities to freely make and change plans and practice self-reliance” (p. 65). The items identified in this study reflecting management conditions were constraint by park management practices and regulations.

In another study, Shafer and Hammitt (1994) looked at the wilderness experience of visitors to the Cohutta wilderness area. The broad objective of this study was to use the definitional descriptors of the Wilderness Act as a conceptual guide for examining recreation experiences and identifying conditions of concern to visitors. As discussed previously, identifying conditions of concern is the first step in the LAC process. The Wilderness Act provides broad dimensional descriptors which were conceptualized as wilderness experience dimensions and used to guide the identification of conditions and thus indicators of wilderness quality (Shafer & Hammitt, 1994). Descriptors used in the Act relate components of a recreational experience (dimensions) which may be influenced by specific setting attributes. In Schafer and Hammitt's study, items were developed to measure the specific conditions believed to represent dimensions of naturalness, solitude, primitiveness and unconfinement. The level of concern that recreational users held for the 35 items developed to represent conditions was measured by asking respondents to rate level of concern on a 7-point Likert scale ranging from "not at all concerned" to "extremely concerned" (Shafer and Hammitt, 1994). This approach provided measures of concern participants held for specific conditions. The 35 items measured were formulated based on written documentation found in hearings which lead to the passage of the Wilderness Act of 1964 (Shafer and Hammitt, 1994). They continue that "colleagues were also consulted regarding the intended meanings of these descriptors" and items were then written according to the interpretations of background documentation and direct input from many who are knowledgeable of wilderness and its recreational opportunities (Shafer and Hammitt, 1994, p. 59). They then conducted a pilot study using the resulting items and the results of this pilot study allowed for refinement of the scale items (Shafer and Hammitt, 1994).

Shafer (1993) when discussing the unconfined descriptor also mentions that the implied meaning in wilderness is freedom from rules and regimentation of society, this includes the regulations placed on use of wilderness itself. Shafer and Hammitt (1994) identified specific indicators of the unconfined dimension of the wilderness experience which will be used in this study because of the direct relevance to the research questions. The indicators identified for the descriptor dimension "unconfined" were: having a portion of the wilderness where camping location is unconfined, the amount of restriction management places on where you may travel in the area, the amount of restriction management places on where you may camp in the area, and the level of difficulty required to obtain a permit.

The indicators used in this study were chosen based on several considerations. The first addresses the multidimensionality of the wilderness experience. It is recommended that a three-fold framework of outdoor recreation-environmental, social, and managerial factors be employed when selecting indicators of quality. Second, since some indicators have been found to be more important than others it is beneficial to include those indicators that have been found to be more important. These indicators were more important in the sense they had a greater effect on the quality of the experience. The indicators, trees damaged in campsites, distance between campsites, and number of groups that pass within sight of your camp have all shown to be important from previous studies (Cole & Hall, 2009). Third, most of the indicators chosen have elements of good indicators previously discussed in the literature review. These indicators have been employed in previous studies and are thus reliable and repeatable. Finally, some of the indicators have been shown to be significant in previous studies (Cole & Hall, 2009). These indicators were selected because it is argued that they help to define the quality of the visitor experience. More specifically, these indicators are thought to help understand the opportunities

to unconfined type of recreation experiences A list of each category of setting attributes and associated indicators chosen to be applied in this research is presented in table 2.2.

Table 2.2: Setting Attribute Categories and Associated Indicators used in this Study

Setting Attribute	Indicators
Environmental	"Having no trees damaged in your campsite"
	"Not seeing mileage signs"
	"Seeing mileage signs"
	"Not seeing regulation signs"
	"Having trails that are completely primitive"
Social	"Not seeing other groups"
	"Having campsite choices that are out of sight and sound of others"
	"Not having other groups camped within sight and sound of your camp"
	"Not having groups pass within sight and sound of your camp"
Managerial	"The ability to have a campfire"
	"No permit is required"
	"Not having restrictions placed on where you may travel"
	"Not having restrictions placed on where you may camp"

One note of importance is that although indicators are to be measurable, this study is simply attempting to identify setting attributes and indicators that may influence the opportunity to have unconfined experiences rather than actually measuring quantities. If these setting attributes are found to be important to opportunities to have unconfined experiences future studies could then quantify them. For example, if "not having other groups camped within sight and sound of your camp" is important to the opportunity to have unconfined experiences, future studies could then inquire "how many other groups camped within sight and sound of your camp" is too many, resulting in degraded opportunities to achieve unconfined wilderness experiences.

Returning to the discussion of methodological approaches, both hypothetical importance evaluations and the actual performance evaluations of setting attributes and indicators seems most appropriate in that it allows visitors to identify which indicators are the most important to opportunities for unconfined type of recreation experiences and those that aren't performing well and need attention. This is referred to as the importance-performance (I/P) construct and was first used in marketing to evaluate customer satisfaction with products and services (Martilla &

James, 1977). It has now been applied in the field of recreation management to provide feedback to managers on aspects of the recreation experience.

2.7 - Importance/Performance

Importance-performance (I/P) has been used by Mengak et al. (1986) to evaluate visitor center services, Hollenhorst et al. (1992) to assess state park cabins, and Hollenhorst and Gardner (1994) to assess wilderness conditions under LAC. The overall purpose of the I/P is to monitor and evaluate components (setting attributes) of the recreation experience. I/P is set up as a grid with the y axis measuring importance and the x axis measuring performance. Thus 4 quadrants are created, and an easily interpretable presentation of information is available (Borrie & Birzell, 2001).

Researchers have suggested that the I/P model and grid has limitations if standard error is not taken into account. To explain, if the importance or performance score of one setting attribute (condition) is close to the corresponding axis the mean for that score might not be significantly different from the value of that axis, and we could not be confident that the attribute is firmly in the designated quadrant. Most satisfaction or I/P studies aggregate results across visitor groups and averages are used to guide management. I/P constructs therefore tend to develop evaluations of "the average camper". But Shafer (1969) argues that the average camper does not actually exist, and managers should instead provide a variety of opportunities for experiences. Aggregated data may fail to guide managers to the broad range of conditions visitors desire (Borrie & Birzell, 2001). In order to give more meaning to the evaluations of setting attributes researchers have tried to explain some of the variation through the measurement of several independent variables (i.e. Cole & Hall, 2009). The measurement of other variables can provide managers with a more complex understanding of how the public perceives setting

attributes (conditions). An example of including other variables to explain variation would be measuring amount of past experience. For example, Cole and Hall (2009) explored the extent to which evaluations varied based on several cognitive and descriptive variables. They found substantial variation in perceived importance of setting attributes based on knowledge, wilderness experience, attachment, and motivations. This research also uses several independent variables to provide a more complete understanding of how visitors perceive setting conditions. As presented in the theoretical model the independent variables used in this proposed study are the perceived freedom in leisure scale, past wilderness experience, visitor trip type, and visitor mode of travel. As this research is attempting to expand our knowledge of wilderness experiences different independent variables were chosen from previous studies.

2.8 - Perceived Freedom in Leisure

The concept of freedom seems to be a foundational part of feeling unconfined. It has been explored in a variety of disciplines. Leisure and recreation studies have also directed their inquiry into the clarification of freedom (Ellis & Witt, 1984). Multiple researchers (Neulinger, 1974; Mannell, 1980; Kelly, 1972) have argued that the experience of leisure is "inextricably associated with a perception of freedom" (Ellis & Witt, 1984, p. 111). Iso-Ahola (1979a, 1979b) found perceived freedom to be an important factor in subject's ratings of the quality of their leisure experience (Ellis & Witt, 1984). Neulinger defines perceived freedom as "a state in which the person feels that what he or she is doing is done by choice and because one wants to do it" (Neulinger, 1981, p.15). Perceived freedom then is "equated with free choice which suggests the idea that to have leisure people must perceive that the social setting provides at least more than one opportunity for action (Mannell & Kleiber, 1997, p. 127). It is generally recognized that freedom and intrinsic motivation are important dimensions in people's lives and theories

suggesting that a sense of freedom or control is a fundamental need and essential to health and well-being (Mannell & Kleiber, 1997).

Perceived freedom in leisure is included as an independent intervening variable in the model presented on page 12. It is hypothesized to be a state of the individual that may influence an individual's evaluation of the importance and performance of setting attributes (objective conditions). It is an independent variable because this state is generated within the individual, based on the individual's perceptions.

When considering what the authors of the Wilderness Act original intent was in including the phrase "outstanding opportunities for solitude or a primitive and unconfined type recreation" (PL 88-577), and that unconfined meant both freedom from the confines of the automobile and freedom from too many restrictions or regulations, free choice becomes vital to achieving Zahniser's true wilderness experience. Zahniser understood the wilderness manager's dilemma that excessive numbers of people could threaten a true wilderness experience and that visits to wilderness areas may need to be rationed in order to preserve both the wilderness itself and the true wilderness experience. But Zahniser argued that reservation systems that limit use in wilderness, "although appalling at first thought," would preserve a "true wilderness experience" more than the imposition of strict regulations on visitor behavior (NWPA Hearings, 1957, p. 194). By limiting the numbers of people visiting wilderness areas, behavioral restrictions imposed by mangers which degrade freedom of choice (i.e. freedom to camp where you want) may not have to be imposed. Thus, although undesirable, limiting visitor use may actually prevent management from having to impose other restrictions and regulations on visitors, protecting the wilderness experience.

2.9 - Perceived Freedom in Leisure Scale

To give more meaning to evaluations of setting attributes and indicators, researchers often explain some of the variation in those evaluations through the measurement of several independent variables. For example, an individual with low perceived freedom can provide a greater understanding of how visitors perceive setting attributes and indicators. Resulting from the investigations of leisure and freedom Ellis and Witt (1984) developed instrumentation for measuring perceived freedom in leisure. The battery consists of 5 sections based on review of the literature related to the social psychology of leisure (Iso-Ahola, 1980a; 1980b; Mannell, 1980) attribution theory (Weiner, 1974; Kelly, 1967), play theory (Ellis, 1973; Lieberman, 1977) motivation (Deci, 1975), and peak experiences or flow (Csikszentmihalyi, 1975; Maslow, 1962; Decharms, 1968) and playfulness. Ellis and Witt (1984) developed the hypothesis that perceived freedom in leisure consisted of four major elements; perceived competence, perceived control and leisure needs, intrinsic motivation, and a behavioral manifestation of these, playfulness (Ellis and Witt, 1984). The perceived freedom in leisure scale has been applied in many studies of leisure including career salience in young adults (Munson, 1993), the mediation of relationships between physical coordination ability and life satisfaction in boys (Poulsen, Ziviani, & Cuskelly, 2007), effects of leisure education on perceived freedom in leisure of adolescents with developmental disabilities (Hoge, Dattillo, & Williams, 1999), the subjective well-being of people with spinal cord injuries (Lee & McCormick, 2004), the relationship between motor performance and peer relations in adolescents (Livesy, Lum, Mow, Toshack, & Zheng, 2010) and, leisure self-efficacy in university students (Hoff & Ellis, 1992). This list is by no means exhaustive but no studies employing the PFL scale to wilderness users could be located. Thus, an

application of the PFL scale both provides a way to give more meaning to participants' evaluations of setting attributes and extends the application of the scale on a novel population.

In summary, the literature related to setting attributes and indicator selection has established that setting attributes (conditions) influence the nature of the visitor experience and understanding what setting attributes influence the experience is critical to effective management. Highly significant or important attributes can be useful indicators within planning frameworks such as LAC. Many studies of setting attributes use encounters as indicators within the social setting to explore solitude, but other indicators may be explored to determine how setting attributes influence the opportunity for unconfined type of recreation experiences. Using the I/P approach provides an effective framework to determine which setting attributes are important to opportunities for unconfined type of recreation experiences. Concepts of freedom and unconfined were important to the founding members of the National Wilderness Preservation System and to the authors of the Wilderness Act. Applying the PFL scale to measure perceived freedom in wilderness visitors may explain variation of respondent's evaluations and mitigate limitations of the I/P approach, most notably the limitations surrounding the average camper. The following chapter introduces the study area, the methods undertaken, and survey development in this study to address the research objectives.

Chapter 3 Methods

3.1 - Introduction

This chapter is divided into several sections and sub-sections that describe the methods used in this study. The first section describes the proposed study location, the Selway-Bitterroot Wilderness and its visitor characteristics. The second section describes what the survey attempted to measure and the rationale for the included variables. The third section discusses data collection and the sample population. The fourth section discusses how data analysis will be used to address the research questions of the study.

3.2 - Study Location

The Selway-Bitterroot Wilderness (SBW), is located in Idaho and Montana and lies within the boundaries of four national forests (N.F.) and seven ranger districts: The Bitterroot N.F., Nez Perce N.F., Clearwater N.F., and Lolo N.F. The SBW encompasses 1,347,644 acres of National Forest land making it the third largest Wilderness area in the contiguous United States. The SBW straddles the Bitterroot Mountain range along the Idaho and Montana border. The Idaho portion contains approximately 1,092,854 acres and the Montana portion contains approximately 254,790 acres. It includes large parts of the Lochsa and Selway River drainages in Idaho and a portion of the western Bitterroot River drainage in Montana. Elevations range from 1,600 feet above sea level on the Selway River to over 10,000 feet on Trapper Peak. There are approximately 1,800 miles of trails in the wilderness area that can be accessed from both the Montana and Idaho sides of the Bitterroot range.

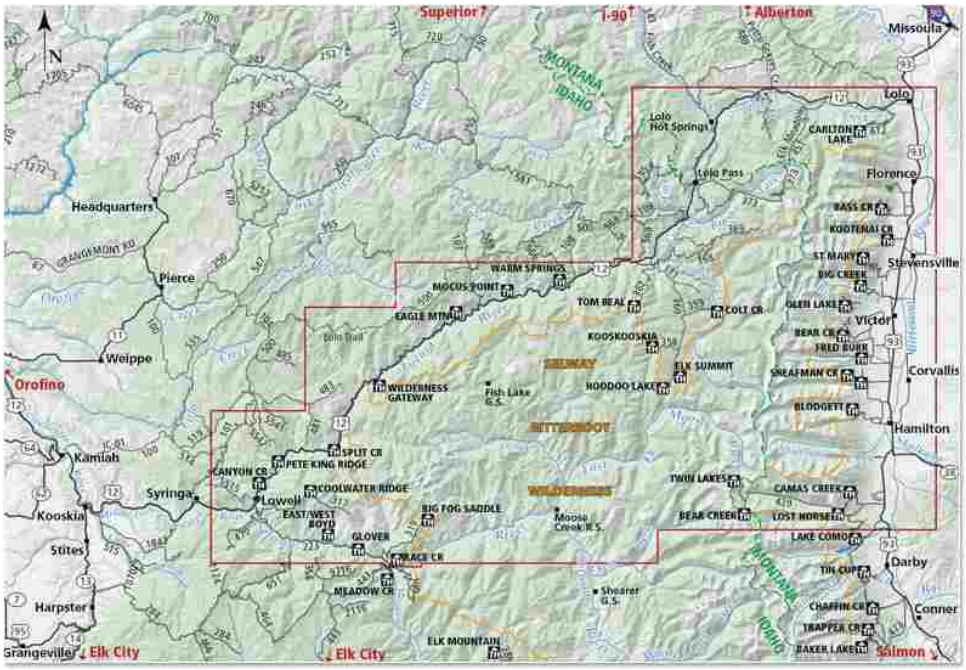


Figure 3.1: Northern Portion of Selway-Bitterroot Wilderness. Retrieved from Cairncarto.com

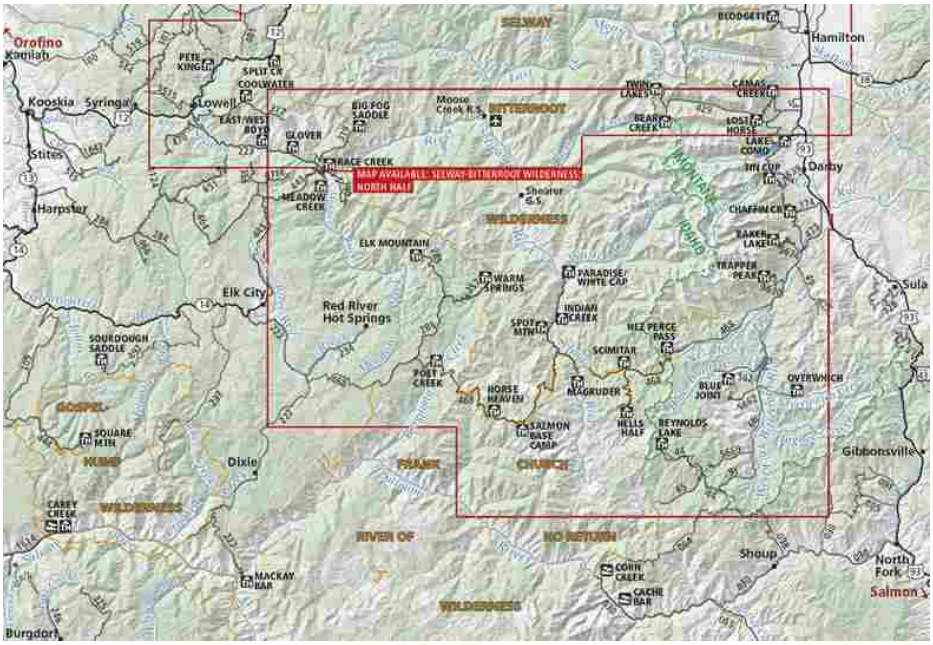


Figure 3.2: Southern portion of Selway-Bitterroot Wilderness. Retrieved from Cairncarto.com

The Montana portion is readily accessible from local roads along U.S. Highway 93 and the road following the Nez Perce Fork of the Bitterroot River. Trailheads are located off major highways, US Highway 12 along the Lochsa River in Idaho and US Highway 93 south of

Missoula, Montana. Other trailheads can be reached from secondary and Forest Service roads. Private permits are not required to use the SBW with the exception of floating the Selway river in which a permit is required. Generally, groups are limited to 20 persons and 20 stock, but there are some areas with smaller group limits such as the 7 lakes basin. Highway 12 running from the town of Kooskia in Idaho to the town of Lolo in Montana is a main thoroughfare that sees heavy use in the summer season. The Wilderness Gateway campground and trailhead is a popular access point for the North side of SBW area off of Highway 12. The Magruder corridor was created in 1980, being a unique road that enables a traveler to drive between two wildernesses; the 1.3 million-acre Selway-Bitterroot Wilderness to the north, and the 2.3-million-acre Frank Church-River of No Return Wilderness to the south. The east end of the Magruder Corridor is 0.8 miles south of West Fork Ranger Station (18 miles southwest of Darby, Montana). This is a popular access point for the South side of the SBW area. Access to the East Side of the SBW in Montana comes from secondary roads off of Highway 93. The two most easily accessible trailheads are located at Lake Como and Bass Creek.

3.3 - SBW Visitor Characteristics

Lucas (1980) conducted a study of visitor characteristics of nine wilderness areas in the western United States in 1980 which included the SBW. Although somewhat dated, this study is still informative when describing the types of visitors to the SBW. In 1980, 73% of visitors to the SBW were between the ages of 16-44 and between 70-80 % of visitors were male (Lucas, 1980). Group types varied by season, method of travel, and length of stay but family groups were the most common during the summer and groups of friends were more common in the fall (Lucas, 1980). In the SBW 40% of visitors were family (all or part) groups, with 37% of groups being friends (Lucas, 1980). Day visitors were more often families than were overnight campers,

however a majority of campers were family groups in most places (Lucas, 1980). “This group structure suggests that motives for wilderness visits included strengthening family ties, perhaps to a greater degree than male-dominated adventure and achievement motives” (Lucas, 1980, p. 48). In the 1980 study of the SBW, 25% of the respondents’ area of residence was from Idaho and 39% from Montana, suggesting that the majority of visitors are from the area surrounding the SWB (Lucas, 1980). Lucas (1980) reports “The most conspicuous and perhaps unexpected conclusion that emerges from this review of wilderness use characteristics is the commonness of day use. In most areas, the typical visitor enters and leaves the same day and, even in the few wildernesses (usually very large) where they are in the minority, day users are still common” (p. 43). Lucas continues that most day visitors do hike into the wilderness but travel shorter distances than overnight visitors (Lucas, 1980). Previous wilderness experience is high with visitors to the SBW with 76% of visitors having previously visited a wilderness area and 30% of visitors having visited the SBW more than 6 times. In Lucas’s study, 27% of visitors have more than 16 years education with 23% having between 13-15 years signifying a very educated visitor. General attitudes were included in Lucas’s study and 70% of visitors said that wilderness was extremely important to them (Lucas, 1980). When asked why they chose to visit a roadless wilderness instead of some other type of area 42% cited wilderness qualities and 23% cited scenic beauty (Lucas, 1980). Overall, visitors are quite well-satisfied with their visits. Satisfaction declines as crowding increases and isolated camp sites become harder to find, but the association of satisfaction with total numbers of encounters with other parties is weak in most places (Lucas, 1890). The general idea of use control is well accepted by visitors, but rigid, pre-planned itineraries are unacceptable to them, this suggests that visitors to SBW may have well-defined notions about concepts such as unconfined type of recreation experiences (Lucas, 1980).

The SBW seems an appropriate location to study unconfined. The lack of permit system, multiple access and travel routes, previous user experience, multiple types of visitor activity, travel mode, trip length, and group structure signal that a variation of responses may be obtained in studying setting attributes effecting opportunities for unconfined type of recreation experiences.

3.4 - Survey Development

The survey instrument design is informed by the conceptual model presented in the literature review and aims to address the research questions proposed. Although a quantitative-based approach has some limitations such as restricting the researcher to setting attributes and indicators thought of prior to survey development (Watson & Roggenbuck, 1998), a survey instrument that employed quantitative approaches was the most appropriate for this study. This conclusion was reached due to the large body of research that has previously been conducted on evaluating setting attributes and testing and developing scales. It also is relevant that the larger sample size associated with quantitative research is invaluable for finding variation in responses associated with the research questions of this study. The resulting data analysis such as factor analysis and analysis of variance tests also hinge on sample sizes large enough to allow meaningful interpretation of analysis results. This research will be testing hypothesized relationships and larger sample sizes often allow more conclusive evidence of differences between groups.

The first section of the survey asked participants briefly about trip characteristics such as length and trip activities. These questions were chosen to come first because the most interesting and immediate subject to the participants is their experience. Allowing them to evaluate their experience pulls them into the survey giving them a vested interest in completing the remaining

sections. Following these short questions was the 20 item unconfined wilderness experience scale asking participants about the importance of certain attributes for feeling unconfined. The next section of the survey asked about the importance of conditions for the opportunity to have an unconfined wilderness experience. Immediately following these importance statements, satisfaction was measured on those same statements. 'Satisfaction' will be used synonymously with 'performance' in the subsequent chapters of this study and is justifiable because performance measures are really measures of satisfaction. The fourth section of the survey consisted of the Perceived Freedom in Leisure scale Short Form B which includes 25 items. The last section of the survey obtained past wilderness experience and visitor and trip characteristic type questions such age and education level. This section helps put a face on respondents in regard to their perceived freedom in leisure and corresponding evaluations of setting attribute indicators. This section will also allow the examination of the characteristics of those in different groups based on cluster membership which will be determined by principal component scores of the unconfined wilderness experience scale. This will help validate and describe the different levels of unconfined components.

20 Item Unconfined Scale

The first section of the survey contained the 20 item unconfined wilderness experience scale. These statements were novel and were an attempt to expand our understanding of what is important to feeling unconfined during the wilderness experience. This scale is meant to uncover the underlying dimensions associated with unconfined experiences. This scale was hypothesized to include 5 components with 4 item statements each. The hypothesized components were Exploration, Freedom, Spontaneity, Untethering, and Self Reliance. Preceding the scale an introductory statement was included to give the respondent some context about unconfined and

it's importance to the Wilderness Act. The introductory statement read "The Wilderness Act of 1964 directs the Forest Service to provide outstanding opportunities for solitude or a primitive and unconfined type of recreation. We are interested in what an unconfined experience feels like for you." Following this introductory statement, a general prompt was included to apply to the following 20 item statements. This prompt read, "In general, for an unconfined wilderness experience how important is it that…" As mentioned, 5 hypothesized components were included and the items for each will be presented below in table 3.1.

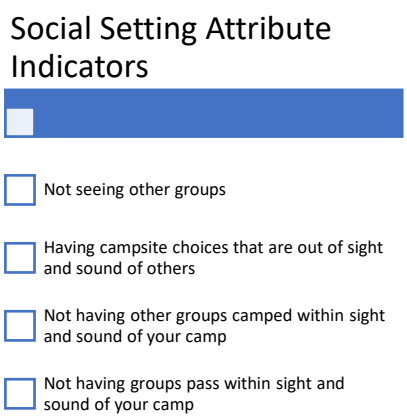
Table 3.1: Hypothesized Components of 20 item Unconfined Wilderness Experience Scale	
Component 1 – Exploration	
	"You feel like you are exploring" "You feel like you can explore away from trails" "You feel like you are going somewhere new" "You feel like you are in wide open spaces"
Component 2 – Freedom	
	"You feel like there are no rules" "You feel like you make your own plans" "You feel like you can camp anywhere" "You feel like you can roam wherever you want"
Component 3 – Spontaneity	
	"You feel like you can change your plans" "You feel like you just pack some things and go" "You feel like you see wildlife unexpectedly" "You feel like you make your own schedule"
Component 4 – Untethering	
	"You feel like you are untethered from email" "You feel like you are untethered from your phone" "You feel like you are free from work responsibilities" "You feel like you're enjoying what you're doing so much you lose track of time"
Component 5 – Self Reliance	
	"You feel like you have the skills to go anywhere you want" "You feel like you make your own way" "You feel like you could keep going" "You feel like you can go at your own pace"

Importance/Performance Measures

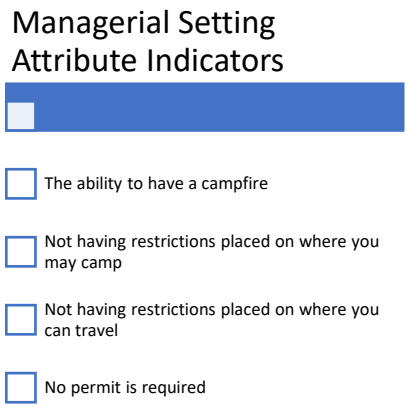
The second section of the survey asked participants to evaluate the importance and the performance of the setting attribute indicators of interest. The indicators chosen have been outlined in the literature review but will be discussed here in more specificity. In the first part of

survey section two, which asked participants to evaluate the importance of setting attributes, the perceived experiences are hypothetical and more of a generic ideal of opportunities for unconfined wilderness experiences. This was purposive, to understand generally which of the indicators chosen are important to opportunities for unconfined experiences. Basing the importance statements on hypothetical experiences allows for inference not based on a single experience tied to a specific wilderness area. Further in the second section, which evaluates the performance of setting attributes, the perceived experiences are more specific to what the visitor actually experienced while on their trip. In order to establish standardized response categories within the survey instrument a 5-point scale was used. This allows visitor preference for conditions to be measured through the metrics of "importance" and "satisfaction" ranging from the lowest values of 1 (not at all important/extremely dissatisfied) to the highest values of 5 (extremely important/extremely satisfied). In addition, a response of "not sure" was included to increase validity of responses provided. If the respondent is truly unsure of how important an item is to their experience this allows them to select this option and not a statement that doesn't reflect their true rating. In order to examine visitor ratings for importance, a lead in question was used to introduce the respondent to the importance and satisfaction scales. For the importance section, the lead in question was, "In general, how important are each of the following conditions to your opportunity to have an unconfined wilderness experience?" Likewise, for the satisfaction section, the lead in question was "We've just asked you how important the following conditions are to having an unconfined wilderness experience, now rate how satisfied you are with these conditions on your most recent trip to the Selway-Bitterroot Wilderness?"

As has been outlined in the literature review, setting attribute indicators addressing the social conditions include; the number and type of groups encountered, having campsite choices that are out of sight and sound of others, not having other groups camped within sight and sound of your camp, and not having groups pass within sight and sound of your camp. Although encounters have most often been associated with solitude it is of interest to the researcher to explore any links of encounters with unconfined recreation experiences. Camps that are within sight or sound of others (could be thought of as a continual, long-term encounter) was addressed as it has been found to be highly significant setting attribute when assessing acceptability of wilderness conditions (Hollenhorst & Gardner, 1994, Cole & Hall, 2009). Having other groups camped within sight and sound of your camp, and having groups pass within sight and sound of your camp has also been shown to be important from previous research and may influence perceived opportunities for unconfined experiences (Cole & Hall, 2009).

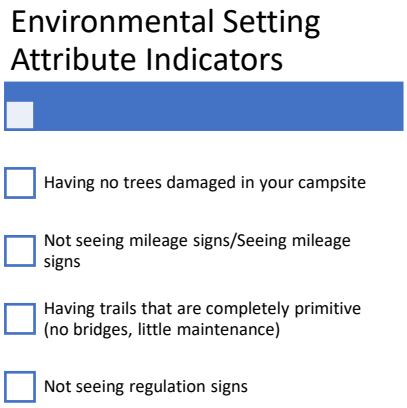


Shafer and Hammitt's (1994) study on Wilderness Act descriptors (solitude, primitive, unconfined, remote, and natural) as dimensions of the wilderness experience relate most directly to managerial setting attribute indicators chosen for measurement in this study. As discussed in the literature review, some rewording of the indicators was needed because of the tautology present. Instead of using the phrase "having a portion of the wilderness where camping location is unconfined" the phrase "Not having restrictions placed on



where you may camp" is used. The final selection of indicators includes; the ability to have a campfire, not having restrictions placed on where you may camp, not having restrictions placed on where you may travel, and no permit is required. These indicators all represented areas of moderately high concern for respondents in Shafer and Hammitt's (1994) study and directly relate to management confinement.

Four indicators related to environmental setting attributes in the SBW area will be evaluated. The first will address trees damaged in campsites as this has been found to be a significant indicator that detracts from wilderness experiences (Cole & Hall, 2009; Shafer & Hammitt, 1994). The second indicator, the amount of mileage signs placed by management may influence the opportunity for unconfined type of recreation experiences. It should be noted that both not seeing mileage signs and seeing mileage signs were included to reduce ambiguity about whether this indicator is a positive or negative aspect of the experience for the visitor. To explain, some visitors may prefer mileage signs be present in the wilderness because the information is seen as valuable to the visitor. Other visitors may see mileage signs as degrading the naturalness of the area and detracting to their experience. The third indicator having trails that are completely primitive has been shown to be of moderate concern (Shafer & Hammitt, 1994) as well as shown to add to the wilderness experience (Cole & Hall, 2009). The fourth indicator amount of signs placed by manager which state regulations about wilderness addresses environmental settings (which may be confining) has been shown to both add to and detract from the wilderness experience making this a variable



that, may add variation in the evaluations of respondents (Cole & Hall, 2009; Shafer & Hammitt, 1994).

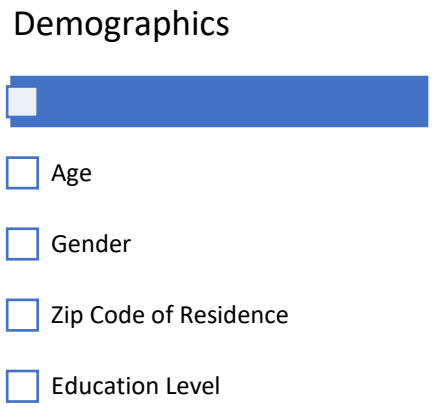
Opportunity for unconfined type of recreation experiences follows from the importance/satisfaction measures. If a setting attribute (condition) is evaluated as highly important and satisfaction is also high, then there is a high opportunity for unconfined type of recreation experiences. Conversely if an attribute is considered highly important and satisfaction is low then this presents a threat to opportunities for unconfined type of recreation experiences. If an attribute rates as unimportant and has low satisfaction, then this may not be important to opportunities for unconfined type of recreation experiences and addresses research question 1.

Perceived Freedom in Leisure Scale

The third section of the survey instrument was the application of the Perceived Freedom in Leisure scale (PFL). The short form version B (the adult version) is applied with the questions modified as little as possible but framing them as relevant to leisure/recreation in wilderness. As outlined in the literature review this scale has not been applied to visitors of wilderness areas and is therefore of value to the wilderness research community. Table 3.2 presents some of the PFL scale items that are included in the short form version B.

Table 3.2: Perceived Freedom in Leisure Scale Sample items	
Perceived Leisure Competence Items	
	"I am good at the wilderness activities I do with other people" "I am good at almost all the wilderness activities I do" "I know many wilderness activities that are fun to do"
Perceived Leisure Control Items	
	"I can do things during a wilderness activity that will enable everyone to have more fun" "I can make the wilderness activity as enjoyable as I want it to be" "I can usually persuade people to do wilderness activities with me even though they don't want to"
Leisure Needs Items	
	"My wilderness activities help me to feel important" "When I feel restless, I can do wilderness activities that will help calm me down" "My wilderness activities enable me to get to know other people"
Depth of Involvement in Leisure Activities	
	"During my wilderness activities there are often moments when I feel really involved in what I am doing" "Sometimes when I do wilderness activities, I get excited about what I am doing" "Sometimes during a wilderness activity there are short periods when the activity is going so well, I feel I can do almost anything"

This scale will be measured in the same manner as appears in the Leisure Diagnostic Battery (Ellis & Witt, 1989) and use a 5-point scale ranging from "strongly agree" to "strongly disagree" with a neutral point delineated as "neither". Although there are shortcomings of including a neutral point in the scale it is determined important to keep the scaling in the original form suggested and used by the developers of the scale. It was determined the phrase "recreation activities" used in all items in the scale would be replaced by "wilderness activities". The total number of items in the perceived freedom in leisure scale is 25.

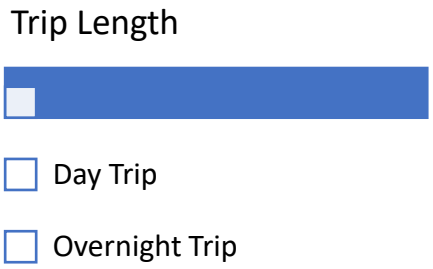


Visitor and Trip Characteristics

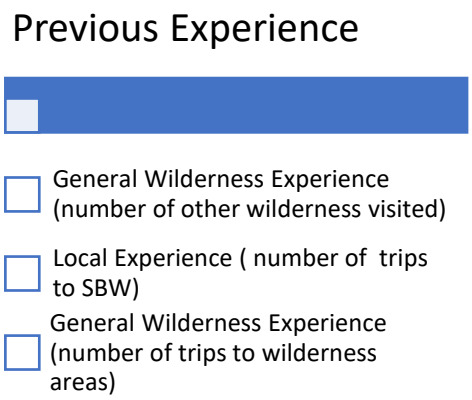
The final section includes questions related to demographics, and past wilderness experience. These demographic questions are asked in order to describe the sample population in a meaningful way and for use with statistical tests of variance in the evaluations of

setting attribute importance and performance. The demographic variables being measured were age, gender, zip code of residence and education level. The zip code is an efficient way to classify visitors as those who travel a long distance or short distance to visit the SBW area.

Another visitor characteristic which will be used in data analysis is whether the trip is a day trip or an overnight trip. Length of trip will be measured for those who overnight. Travel type will also be included as difference in mode of travel may influence evaluations of setting attribute indicators and unconfined wilderness experience scale items.



Lastly, previous experience was determined to have potential importance and has been shown in previous studies (Cole & Hall, 2009) to be a predictor of variation in the evaluation of setting attribute importance and performance. Previous wilderness experience has also been shown to have a positive relationship with sensitivity to crowding (Manning, 2011) and may influence how participants evaluate encounter related setting attributes. Based on Watson & Niccolucci (1992) and Cole and Hall (2009) previous experience was determined by wilderness visitation (number of wilderness areas visited), local experience (number of prior SBW trips), and general wilderness experience (number of trips to wilderness areas in lifetime). Two questions for previous wilderness experience were binary categorical, “Have you ever visited a wilderness area before this trip?” and “Have you ever visited the Selway Bitterroot Wilderness before this trip?” If the respondent answered no, skip logic was used to forward the respondent to the next relevant question in the



survey. If a yes answer was provided the respondent was asked “About how many other wilderness areas have you visited in your lifetime? “About how many other trips to wilderness areas have you taken in your lifetime?”, and “ About how many times have you visited the Selway Bitterroot Wilderness in your lifetime?”. The response categories for these items ranged from 0-5, 6-10, 11-15, and more than 15. These categories were determined to provide an appropriate range for determining previous wilderness experience. These items will be used to construct the variate for a cluster analysis which should show distinct experience clusters.

3.4 - Sampling Design

The first step in survey implementation was to determine whether it should be administered on-site or if a mail-back approach would be appropriate. Several considerations were taken into account including cost-effectiveness, sample size estimates, and whether or not the concepts we were measuring would be influenced by recall bias. It was determined that a mail-back approach by e-mail would provide a sufficient sample size and allow for more items to be included in the survey. These initial questions asked at first contact provides a way to check non-response bias without having to re-contact visitors who did not return surveys. The initial questions are taken from section three, the PFL scale and included the lead in prompt “These questions deal with how you feel about your wilderness experiences”. The items included were “During wilderness activities there are often moments when I feel really involved in what I am doing” and “I have the skills to do wilderness activities in which I want to participate.” As with the PFL scale, they were measured on a 5-point Likert scale ranging from strongly agree to strongly disagree”. Trip information about whether the trip was a day trip or overnight trip was included along with the zip code of the respondent’s main residence. These questions were short to answer and minimized the burden placed on the respondent during the initial contact. It was a

concern that experience related questions may be subject to memory decay and therefore we may be measuring constructed memories of how conditions influenced experience and not the actual experiences (Borrie et al., 1998) and this was taken into account by providing the survey in e-mail format. Using an electronic format is appropriate because it reduces printing and mail-back costs and provides the participant with a survey that was immediately available upon return from their trip, reducing memory decay if filled out promptly. The survey is also of sufficient length that the burden to complete on-site was determined to be too great and discourage participation leading the researcher to opt for a send back approach. It is recognized that not all visitors may have home internet access. Pew Research Center (2017) estimates that 73% of all Americans do have home broadband internet. In the event that a visitor is willing to participate but lacked internet access hard copies of the survey were available to administer on site or to mail to the participant based on preference. At the end of each week of sampling the full survey instrument was e-mailed to those who agreed to participate. In a study by Schaefer and Dillman (1998) exploring the development of a standard e-mail survey methodology it was found that when designed using specific methods (repeat contacts, personalization of survey, thank you letters) e-mail surveys had very similar response rates 57.5% (mail) to 58% (e-mail) to that of paper surveys. Contacts were made regardless of whether visitors are entering or exiting as the survey can be filled out when the respondents return. Having a return by e-mail design then reduces costs, reduces participant burden, attempts to mitigate recall bias and memory decay and allows for a less complex sampling plan than if surveys were administered on-site.

3.5 - Sample Population

The study population of interest for this study was adults aged 18 and over entering the wilderness. In thinking about the sample population certain criteria were considered. Based on

IRB approval requirements and the cognitive elements this research proposes, respondents must be at least 18 years of age. Respondents also needed to be recreationists and their primary purpose for visiting the SBW was to engage in recreation/leisure. This means that FS employees, outfitters and guides or volunteer work party groups were ineligible to participate in the survey if serving in some form of official capacity.

The sample population also must be travelling into the wilderness during the course of their trip. The main purpose of the research is to understand opportunities for unconfined type of recreation experiences in wilderness areas and thus respondents were only eligible if visiting the SBW area. However, both day use and overnight visitors were included the study. The inclusion of both types of visitors adds interesting analysis and will provide insight into whether these types of visitors differ in the evaluations of setting attribute indicators and perceived freedom.

There is a portion of visitors who solely visit the wilderness to float the Selway River as it is one of Idaho's Wild and Scenic premier whitewater rafting rivers. These visitors may present differences to those of other visitors of the SBW. These visitors often float with so much gear that the experience becomes much different from that of a traditional wilderness experience. Boaters are able to bring vast amounts of food, alcohol, clothes and other amenities such as tables, chairs, stoves, games, etc., that their wilderness experience is much different from that of someone travelling by foot or pack stock. Boaters are also somewhat confined to the course of the river and often don't deviate from that while in wilderness. Therefore, the unit of analysis for this study was the individual wilderness recreationist, who is defined as any hiker, stock user, fisher person, climber, and wildlife viewer, recreationist entering the wilderness area over 18 years of age.

3.6 - Data Collection

The SBW is so large that it was impractical for this proposed research to obtain a representative random sample of all wilderness visitors. There are 38 main trailheads in the north half of the SBW and 22 main trailheads in the south half of the SBW further illuminating the difficulty of performing random sampling at all trailheads. Due to this researcher's limited resources the generally busiest trailheads in summer were chosen for sampling in an attempt to generate a relatively large sample size for resulting data analysis.

Use estimates are taken from National Visitor Use Monitoring (NVUM) surveys completed in 2012 for the Bitterroot N.F. and 2016 for the Nez Perce-Clearwater N.F. It must be noted that these NVUM estimates were never intended to be used at the Forest or Wilderness level. Because they were intended for use at the national level when scaling down to the forest level, the standard deviations for use are quite large. Total visitation for the SBW on the Bitterroot N.F. is estimated at 86,000 annual visits $\pm$ 43.2 % at a 90% confidence level. This means visitation levels could be as low as 48,848 annually for the SBW in the Bitterroot N.F. There is not NVUM use estimate data for specific trailheads. Total visitation estimates for the SBW on the Nez-Perce Clearwater N.F. are 76,000 annual visits $\pm$ 34.1 % at 90% confidence levels. Similarly use levels could be as low as 50,084 annual visits. Again, use estimates for specific trailheads are not available as part of the NVUM monitoring for the Nez-Perce-Clearwater N.F.

Through personal correspondence with current Forest Service employees (Stock program manager Bitterroot N.F., Central Zone Recreation Staff Nez-Perce-Clearwater N.F.) the trailheads that likely receive the largest summer visitation from the Montana side are the Blodgett Creek, Bear Creek, Twin Lakes, Kootenai Creek, Trapper Creek, St. Mary peak, and

Tin Cup trailheads. The trailheads receiving the most use from the Northern Idaho portion are Wilderness Gateway, Warm Springs, Race Creek, Hoodoo Lake, and Elk Summit. Of these trailheads, 8 presented the best opportunity to efficiently obtain high numbers. The trailheads that were sampled represent two general regions of the SBW, the North by Northwestern region and the East by Southeastern region. The four trailheads sampled in the North region were Wilderness Gateway, Race Creek, Elk Summit, and Hoodoo Lake. Hoodoo Lake and Elk summit are very close to each other and present an opportunity to sample efficiently. These four trailheads are accessed from highway 12 in Idaho. The four trailheads representing the Eastern region that were chosen for sampling were Bass Creek, Big Creek, St. Mary Peak, and Tin Cup. These represent the Eastern side of the SBW and are all accessed from highway 93 in Montana. Sampling the two regions attempts to provide variation in visitor characteristics and place of residence.

3.7 - Sampling Procedure

Table 3.3: Sampling Location by Date

Location	June	July	August
Wilderness Gateway	1st , 2nd	8th , 26th	4th , 21st
Elk Summit	24th, 25th	7th , 27th	3rd , 22nd
Hoodoo Lake	22nd, 23rd	6th , 28th	2nd , 23rd
Race Creek	3rd, 4th	5th , 29th	1st , 24th
Bear Creek (N)	16th, 17th	9th , 23rd	6th , 25th
Twin Lakes	28th, 29th	10th, 22nd	7th , 26th
St. Mary Peak	15th, 27th	11th, 24th	8th , 27th
Tin Cup	18th, 30th	12th, 21st	9th , 28th

Sampling occurred for full days at all 8 trailheads but alternated between earlier and later starting times. This was an attempt to increase variation in user characteristics providing more interesting analysis. Early sampling occurred from 7:30 a.m. to 3:30 p.m. It was assumed that

most trips would not start before 7:30 a.m. Later sampling occurred from 11 a.m. to 7 p.m. as it is assumed that the majority of trips would not end later than 7.p.m. Sampling occurred during the summer months of June, July and August. 48 sampling days were allocated between the three months giving each month 16 sampling days. Due to trailhead access issues and a high snowpack the sampling days could not be randomized. As this is a convenience sample, trailheads that are close to each other were sampled on subsequent days. Each of the 8 trailheads were sampled 6 times totaling 48 sampling days. The desired minimum sample size is 250 after nonresponse. If 10 surveys can be achieved per day of sampling resulting in 480 surveys multiplied by a response rate of 58% (Schaefer and Dillman (1998) 274 surveys could hopefully be attained.

3.8 - Survey Implementation

Several attempts were made to reduce non-response bias following Schaefer and Dillman's (1998) recommendations of e-mail survey methods. The first concerned participants not returning surveys. If, after one week from initial mailing the survey was not completed and returned another survey was e-mailed with modified cover letter articulating the importance of completion. If after another week the survey was not returned a third survey was sent. If after third mailing the survey is not returned the participant will be considered a non-respondent. The second concerns survey design. Up to date software was used to design the survey and using design principles outlined by Dillman (2007). Attempts were made to reduce respondent burden. The survey was relatively simple to complete and submit in an attempt to increase participant completion. Personalization has also shown to increase response rates and a personalized cover letter was provided with the e-mail survey (Schaefer & Dillman, 1998).

3.9 – Data Analysis

The Statistical Package for the Social Sciences (SPSS) version 25.0 was used to perform the data analysis. The recorded data was downloaded from the online survey program Qualtrics and entered into SPSS as a data file. Data cleaning was performed to recode responses into numerical format and to replace missing values (items not responded to) into a format that SPSS can use when performing statistical procedures. Descriptive analysis followed data cleaning and will be presented first in the results section. This is an attempt to describe the sample population acquired by the study. Cross-tabulations with significance tests were then preformed to further describe the sample population, focusing on significant differences between different categories of visitors. After describing the sample population through these methods, principal components analysis was performed on the 20 item unconfined scale with component scores via the Bartlett method being saved as variables. Analysis of Variance (ANOVA) was then used to explore component scores with categorical variables to determine if differences between groups existed on the unconfined scale. Additionally, component scores were subjected to Cluster Analysis using K-Means to further define groupings based on the unconfined scale. Cluster Analysis using K-Means was also used to determine previous wilderness experience clusters that will be used as categorical variables when conducting ANOVA's with other variables. The purpose of conducting analysis of variance will help determine if differences exist on evaluations of importance and performance across different visitor types and trip characteristics.

3.10 – Study Hypothesis

Following the literature review and methods chapter, formal study hypothesis can now be established and will be presented subsequently.

H1: Unconfined cluster groupings will differ on mean PFL scores.

H2: Components of unconfined experience scores will differ by length of stay of visitors.

H3: Components of unconfined experience scores will differ among sex of visitors.

H_4: Components of unconfined experience scores will differ among age range categories.

H_5: Components of unconfined experience scores will differ among mode of travel.

H_6: Components of unconfined experience scores will differ across wilderness experience levels.

H_7: Ratings of Importance for conditions related to unconfined will differ across unconfined cluster groups.

H_8: Ratings of Satisfaction for conditions experienced related to unconfined will differ across unconfined cluster groups.

3.11 - Summary

The next section of this paper will present the results starting with descriptive statistics and frequencies of the sample population followed by cross tabulations with significance tests. Following the cross tabulations, the results of the raw data of the 20 item unconfined scale, the importance and performance measures, and the PFL scale will be examined and discussed.

Chapter 4 Results

4.1– Descriptive Statistics

This section provides a description of the sample population of wilderness visitors who participated in this study by completing surveys during the summer of 2018. A total of 358 visitors were contacted at 8 different trailheads surrounding the SBW. Of these 358 visitors, all were sent the survey via e-mail and the Qualtrics survey that was developed for the study. Of these 358 invitations, 238 were fully completed resulting in a response rate of 66%. 8 visitors did opt to fill out a paper version of the survey on site resulting in 245 completed surveys and a final response rate of 68%.

Of the 245 respondents, 125 (51.1%) were female, and 120 (48.9 %) were male. This high number of female respondents is atypical and may suggest a trend that the distribution of wilderness visitation is becoming more equally distributed between the sexes, although, it must be noted, that this study was a convenience sample and not representative of the entire population of visitors to the SBW during the summer of 2018. The high percentage of female respondents may also be due to urban proximity as a number of trailheads sampled were within an hour drive of Missoula, MT.

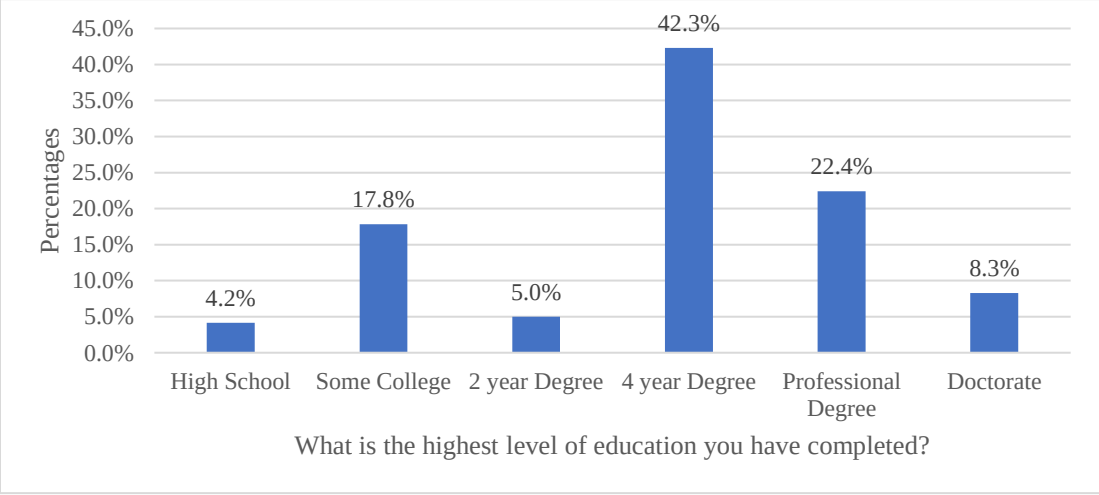
Age of respondents was measured categorically, with the largest number of respondents, 64, comprising 26.1 % of the sample falling in the 25-34 year old range, the next largest category included 51 respondents (20.8%) in the 55-64 year old range. The third largest category included 48 respondents (19.6%) in the 33-45 year old age range. The entire age distribution of the sample is presented in table 4.1 on the following page.

Table 4.1: Age Distribution of Sample Population in Selway-Bitterroot Wilderness

Age range	Frequency	Percent	Cumulative Percent
18-24 years old	36	14.7	14.7
25-34 years old	64	26.1	41.2
35-44 years old	48	19.6	60.9
45-54 years old	26	10.6	71.6
55-64 years old	51	20.8	92.6
65-74 years old	14	5.7	98.4
75-84 years old	4	1.6	99.2
Missing	2	.8	100
Total	245	100	

Education level was also measured and 95.8% of respondents report having completed at least some college level coursework and 102 respondents (42.3%) have a four year degree. 3 respondents choose not to answer this question with 1 missing value for a N = 241 (98.4%). While the number of high school graduates seems high, the U.S Census Bureau (2018) reports that the percentage of the American population age 25 and older that completed high school or higher levels of education reached 90 percent in 2017. Previous wilderness studies have also seen high levels of education within sample populations for a number of decades (Cole et al., 1995). The educational attainment distribution is fully represented in figure 4.1 below.

Figure 4.1: Educational Attainment Distribution of Sample Population in Selway-Bitterroot Wilderness



3 modes of travel were employed by respondents with the vast majority 219 (89.4 %) answering hiking as their mode of travel. 15 respondents (6.1%) answered stock use, and 8 respondents (3.3%) answered trail running for the question “how did you travel on this trip?”

Looking at the duration of stay of the sample, 64.1% of respondents (157) were day visitors with 35.9% of respondents (88) staying overnight or longer. When examining the distribution of the overnight visitors, the longest trip duration was 11 nights, with the majority of overnight trips only lasting 1 night (N=38, 15.5%). The distribution of the length of stay can be seen in table 4.2.

Table 4.2: Respondent Length of Stay in Selway-Bitterroot Wilderness

Length of Stay	Frequency	Percent	Cumulative Percent
0 Nights	157	64.1	64.1
1 Nights	38	15.5	79.6
2 Nights	17	6.9	86.5
3 Nights	9	3.7	90.2
4 Nights	5	2.0	92.2
5 Nights	9	3.7	95.9
6 Nights	5	2.0	98.0
7 Nights	3	1.2	99.2
11 Nights	2	.8	100
Total	245	100	

Group size was another variable measured in the survey, with group sizes ranging from solo visitors to one group as large as 20. The mean group size calculates to 3.1, with the largest number of respondents 108 (44.1%) reporting a group size of 2. 90.2% of the sample consisted of groups with 5 visitors or less. Table 4.3 presents the distribution of the group sizes of this studies sample.

Table 4.3: Distribution of Group Size of Respondents in Selway-Bitterroot Wilderness

Group size	Frequency	Percent	Cumulative Percent
1	32	13.1	13.1
2	108	44.1	57.2
3	34	13.9	71.1
4	28	11.4	82.5
5	18	7.3	89.8
6	8	3.3	93.1
7	3	1.2	94.3
8	3	1.2	95.5
12	9	3.7	99.2
20	1	.4	99.6
Missing	1	.4	100
Total	245	100	

A question, “which of the following activities did you do on this trip?” was included in the survey with the option to select multiple activities. This made analysis difficult for this question as the range of combinations of responses created 83 groupings for this question. To present the results more clearly the original activity categories are stated and are presented in table 4.4 with the percentage of respondents selecting that activity.

Table 4.4: Activity participation of Respondents in Selway-Bitterroot Wilderness

Activity	Frequency	Percent
Hiking	206	84.1
Horseback riding	14	5.7
Backpacking	83	33.8
Camping	78	31.8
Fishing	24	9.7
Hunting	2	0.8
Swimming	52	21.2
Nature Study	62	25.3
Climbing	4	1.6
Photography	123	50.2
Rafting/Boating	1	0.4
Running	18	7.3
Other	38	15.5

* Respondents were allowed to select multiple activities

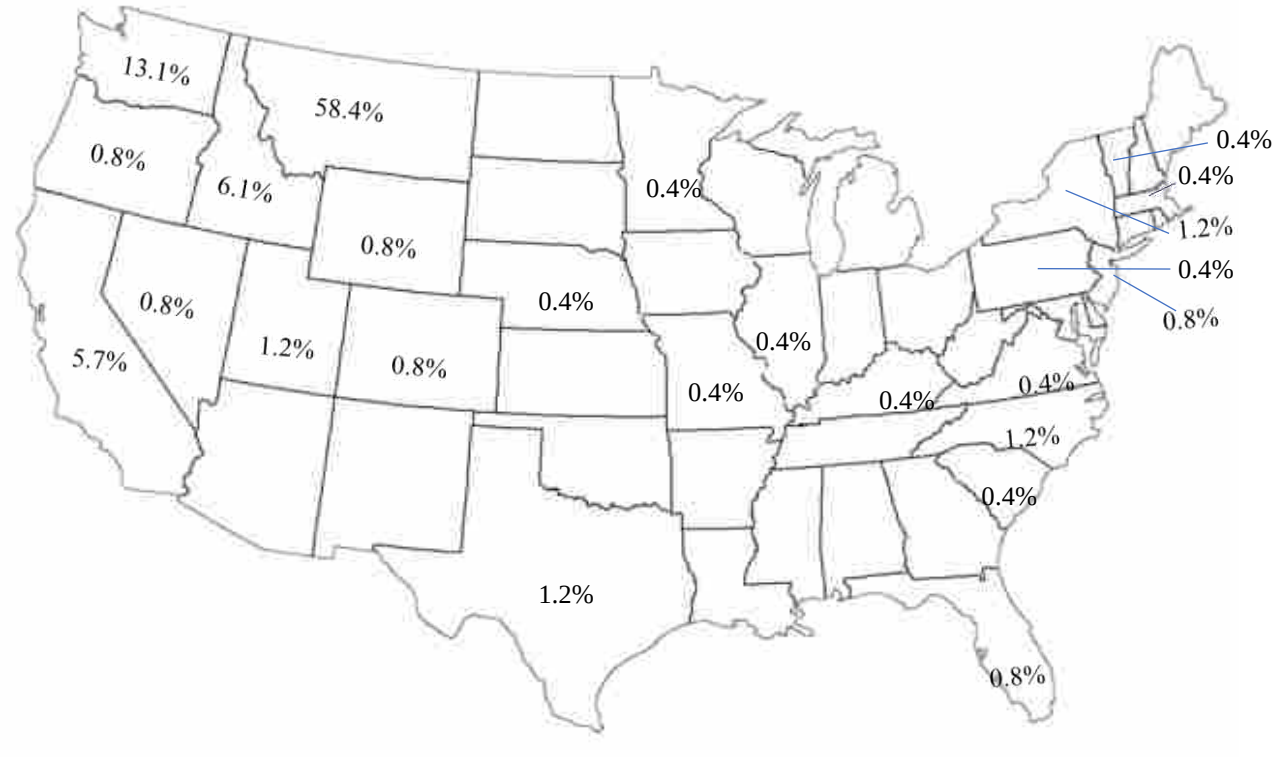
The respondents that selected ‘other’ were able to elaborate on the activity they were referring to and the activities that were provided can be seen in table 4.5.

Table 4.5: Self-reported Activities of Respondents in Selway-Bitterroot Wilderness

Activity	Frequency	Percent
Volunteer trail maintenance	10	4.1
Meditation	4	1.6
Soaking in Hot Springs	3	1.2
Dog off leash	2	0.8
Relaxation/Contemplation	2	0.8
Psychedelics/Drug use	2	0.8
Mountain Biking	1	0.4
Backpacking my Baby	1	0.4
Peak Bagging	1	0.4
Nature walk with Children	1	0.4
Visiting Fire lookouts	1	0.4
Off-route trail finding	1	0.4
Mycology	1	0.4

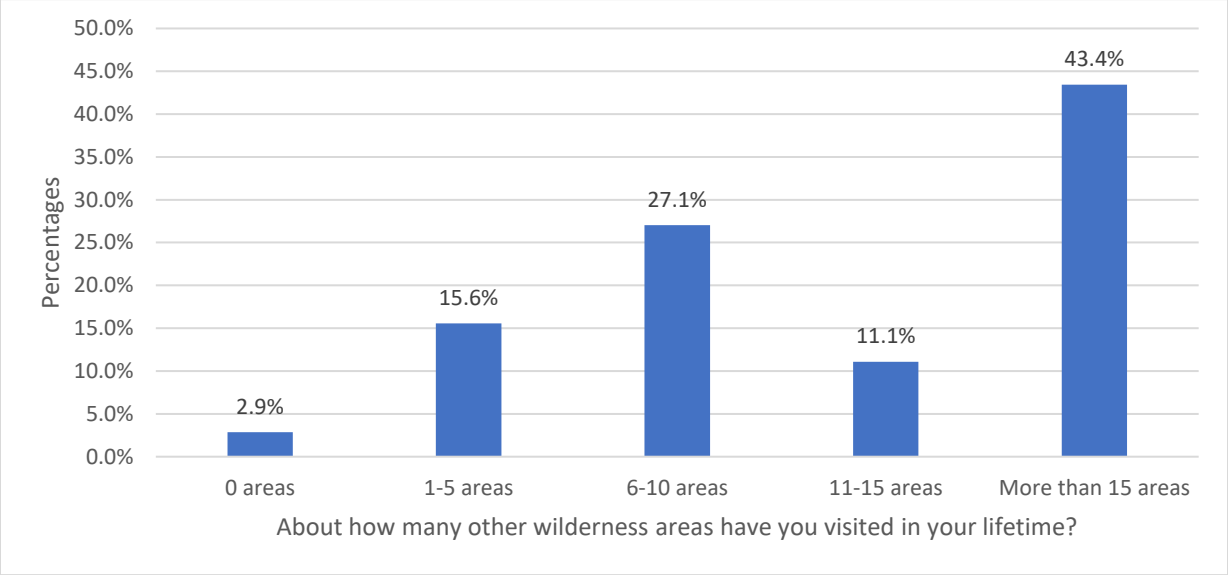
The residence information of respondents was collected by asking “what is the zip code of your primary residence?” Of the 243 respondents who answered, the largest number (143 or 58.8%) were from Montana. The next largest number, 32 respondents (13.1%), were from Washington state, followed by 15 respondents (6.1%) claiming primary residence in Idaho, and 14 respondents (5.7%) claiming primary residence in California. All other states represented comprise less than 2 percent of the total sample. In total 26 states were claimed by respondents as their area of primary residence. Figure 4.2 on the following page shows a graphical representation of place of residence claimed by survey respondents

Figure 4.2: Percentage of Respondent primary place of residence in Selway-Bitterroot Wilderness



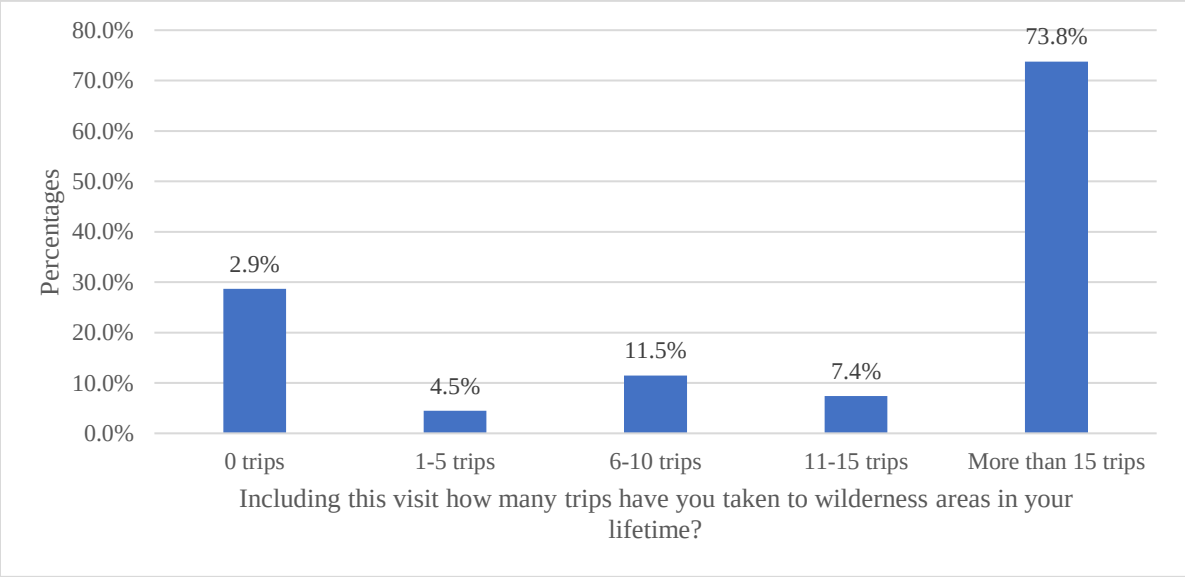
When examining the sample's previous wilderness experience a number of items were used to determine general wilderness experience as well as if respondents had taken previous trips to the SBW. These items combined were subjected to a cluster analysis to form groupings of respondents with differing levels of wilderness experience and will be discussed in the data analysis section, yet we can examine the responses individually as well. 238 respondents (97.1%) have visited a wilderness area previous to this trip. The number decreases when asking specifically about the SBW, with 190 respondents (77.5%) having previously visited the SBW. When asked about how many other wilderness areas they have visited, 106 respondents (43.3%) report having visited more than 15 other wilderness areas. The distribution of other wilderness areas visited prior to this trip can be seen in figure 4.3.

Figure 4.3: Number of other Wilderness Areas Visited by Respondents in Selway-Bitterroot Wilderness



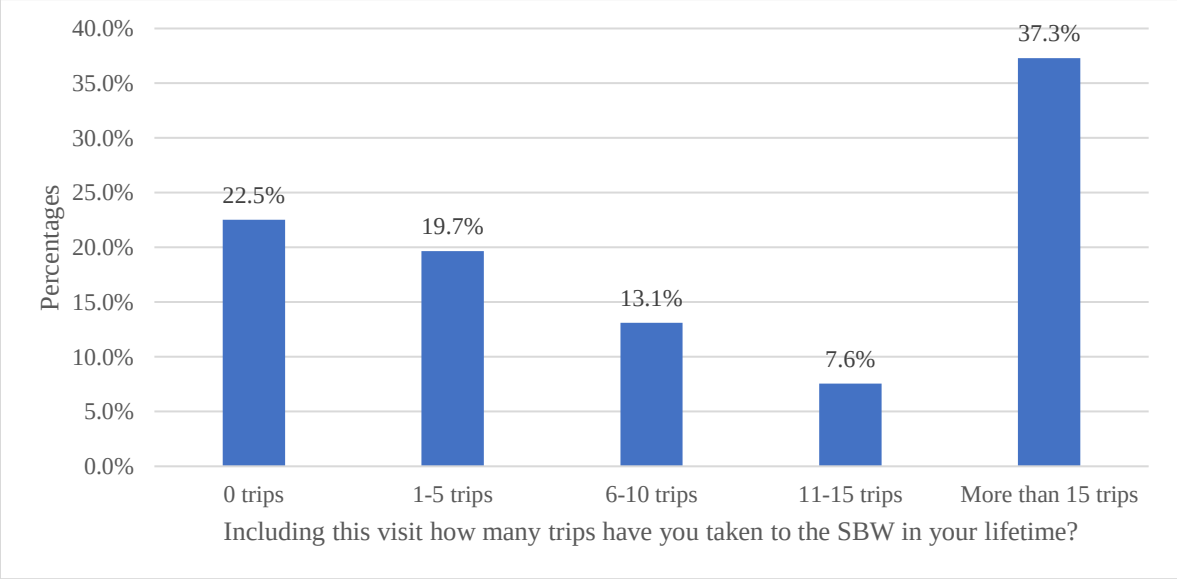
An even larger portion (180) of the respondents have taken more than 15 trips to wilderness areas in their lifetime and comprise 73.7% of the sample. The next largest category was respondents having taken 6-10 other trips to wilderness areas with 28 respondents comprising 11.4% of the sample population. The third largest category included 18 respondents, and 7.38% of the sample having taken 11-15 other trips. 11 respondents (4.5%) report having taken 1-5 trips to wilderness areas and only 7 respondents (2.9%) report no previous trips to any wilderness area in their lifetime. The distribution of number of other trips taken to wilderness areas is displayed in figure 4.4 on the following page.

Figure 4.4: Number of Previous Trips Taken to Wilderness Areas by Respondents



The distribution of the number of trips taken to the SBW is more equal than number of trips nationally, however 91 respondents (37.3%) report having taken more than 15 trips to the SBW in their lifetime. The breakdown of previous trips to the SBW can be seen in figure 4.5.

Figure 4.5: Number of Previous Trips to the Selway-Bitterroot Wilderness by Respondents



4.2 – Comparisons Across Categorical Variables

To further describe the sample population and to allow significance testing between descriptive characteristics of the sample across categorical variables, cross tabulations were performed. When looking at the frequency distributions across categorical variables, chi-square tests of independence are performed to determine if statistically significant differences exist in the sample population (Vaske, 2008). Cross-tabulations are useful to further describe and examine the sample population. For example, we can cross-tabulate the duration of the trip and the sex of the respondent to see if an even amount of men and women are taking overnight trips. If a difference does exist, we can determine if it is a statistically significant difference when compared to a Chi-square distribution. In each case variables (sex, age, mode of travel, and duration of trip) were cross-tabulated against each other.

When examining the duration of trip and the sex of the respondent, the Pearson chi-square test of independence shows that the differences between these variables is not significant, χ^2 (df = 1, n = 243) = 3.767, p = .052. Within the variation of day trip versus overnight trip, more females (87) report their trip as a day trip than males (68). However, the distribution for overnight trips revealed more males (50) reporting an overnight stay versus females (38), however these are not considered statistically significant differences. Table 4.6 shows the duration of trip of respondents by sex below.

Table 4.6: Overnight versus Daytrip of Respondents by Sex in Selway-Bitterroot Wilderness

		Sex		
		Male	Female	Total
Trip Duration	Day Trip	68 (43.9%)	87 (56.1%)	155 (100%)
	Overnight Trip	50 (56.8%)	38 (43.2%)	88 (100%)
	Total	118 (48.6%)	125 (51.4%)	243 (100%)

* Percentages report sex representation within trip duration

The next cross-tabulation performed can be seen in table 4.7 and is the age ranges of the sample versus the distribution of male and female respondents. The Pearson chi-square test of independence again reveals that the differences between these variables was not statistically significant at the .05 level, χ^2 (df = 6, n = 242) = 10.137, p = .119. It must be noted that the age range for 75-84 has an expected cell count of less than 5 and this test should be interpreted with caution. This age category also shows the most significant deviation from the total distribution of the sample where males respondents accounted for 75% of the sample in that age range although the numbers are low in this age range overall with only 4 respondents. The age range of respondents by sex is displayed below.

Table 4.7: Age range of respondents by Sex in Selway-Bitterroot Wilderness

		Sex		
		Male	Female	Total
Age Range	18-24 years old	16 (44.4%)	20 (55.6%)	36
	25-34 years old	23 (35.9%)	41 (64.1%)	64
	35-44 years old	28 (58.3%)	20 (41.7%)	48
	45-54 years old	12 (46.2%)	14 (53.8%)	26
	55-64 years old	30 (60%)	20 (40%)	50
	65-74 years old	6 (42.9%)	8 (57.1%)	14
	75-84 years old	3 (75%)	1 (25%)	4
	Total	118	124	242

* Percentages report sex representation within age range

In table 4.8 the mode of travel within the sample were cross-tabulated with the distribution of sex. The Pearson chi-square test of independence shows no statistically significance difference between these variables, χ^2 (df = 2, n = 240) = .449, p = .799. While the distribution among runners and hikers is nearly even between males and females, 50/50 and 49/51 respectively, stock users where 60% female and 40% male.

Table 4.8: Mode of Travel of Respondents by Sex in Selway-Bitterroot Wilderness

		Sex		
		Male	Female	Total
Mode of Travel	Hiker	106 (48.8%)	111 (51.2%)	217
	Stock	6 (40%)	9 (60%)	15
	Runner	4 (50%)	4 (50%)	8
	Total	116 (48.3%)	124 (51.7%)	240

* Percentages report sex representation with mode of travel

Table 4.9 shows the age ranges of the sample population cross-tabulated with duration of trip. The Pearson chi-square test of independence showed the differences between these variables was significant, χ^2 (df = 6, n = 243), 14.654, p = .023. All age range categories had higher counts for respondents reporting the trip as a day trip with the exception of the age 18-24 year olds which was even among day and overnight trips. The most significance difference of age range distribution exists within 45-54 year olds which saw 88.5% of the sample reporting the trip as a day trip.

Table 4.9: Age Range of Respondents by Overnight versus Day trip in Selway-Bitterroot Wilderness

		Trip Duration		
		Day Trip	Overnight Trip	Total
Age Range	18-24 years old	18 (50%)	18 (50%)	36
	25-34 years old	37 (57.8%)	27 (42.2%)	64
	35-44 years old	29 (60.4%)	19 (39.6%)	48
	45-54 years old	23 (88.5%)	3 (11.5%)	26
	55-64 years old	33 (64.7%)	18 (35.3%)	51
	65-74 years old	11 (78.6%)	3 (21.4%)	14
	75-84 years old	4 (100%)	0 (0%)	4
	Total	155	88	243

* Percentages report trip duration with age range

In table 4.10, the mode of travel within the sample was cross-tabulated with trip duration. The Pearson chi-squared test reveals a statistically significant difference between these variables, χ^2 (df = 2, n = 242), 7.055, p = .029. It should be noted that the cell count for runners on overnight trips is less than the expected cell count of 5. As expected, 100% of the runners report

their trip as a day trip. It is interesting that 80% of stock users (12) also report their trip as a day trip.

Table 4.10: Mode of Travel of Respondents by Overnight versus Day Trip in Selway-Bitterroot Wilderness

		Trip Duration		
		Day Trip	Overnight Trip	Total
Mode of Travel	Hiker	133 (60.7%)	86 (39.3%)	219
	Stock	12 (80%)	3 (20%)	15
	Runner	8 (100 %)	0 (0%)	8
	Total	153 (63.2%)	89 (36.8%)	242

* Percentages report trip duration with mode of travel

When examining the differences between age range of respondents and mode of travel no statistically significant differences were found in the Pearson chi-square test of independence, χ^2 (df = 12, n = 240), 14.344, p = .279. It is unsurprising that all of the runners were below the age of 55, however there was somewhat equal distribution of stock users across the age ranges of the sample. The distribution of age ranges of respondents by mode of travel is presented in table 4.11 below.

Table 4.11: Age Range of respondents by Mode of Travel in Selway-Bitterroot Wilderness

		Mode of Travel			
		Hiker	Stock	Running	Total
Age Range	18-24 years old	35 (97.2%)	0 (0%)	1 (2.8%)	36
	25-34 years old	58 (92.1%)	2 (3.2%)	3 (4.8%)	63
	35-44 years old	42 (87.5%)	3 (6.3%)	3 (6.3%)	48
	45-54 years old	23 (88.5%)	2 (7.7%)	1 (3.8%)	26
	55-64 years old	44 (89.8%)	5 (10.2%)	0 (0%)	49
	65-74 years old	11 (78.6%)	3 (21.4%)	0 (0%)	14
	75-84 years old	4 (100%)	0 (0%)		4
	Total	217 (90.4%)	15 (6.3%)	8 (3.3%)	240

* Percentages report mode of travel within age range

4.3 – Comparison with Past Visitor Characteristics in the SBW

In order to further describe and examine this study's population this section compares sample population characteristics to those in Lucas (1980) study of use patterns and visitor characteristics, attitudes and preferences in nine wilderness and other roadless areas. It should be

noted that this study was not a true random sample representative of the population of all SBW visitors and was a convenience sample. It is beneficial to compare trends among past SBW samples and provides a more thorough understanding of this study's sample. Again, it should be noted, any difference between this study and Lucas (1980) may be a result of trends over time or a result of sampling and it is not easy to know which.

Sex

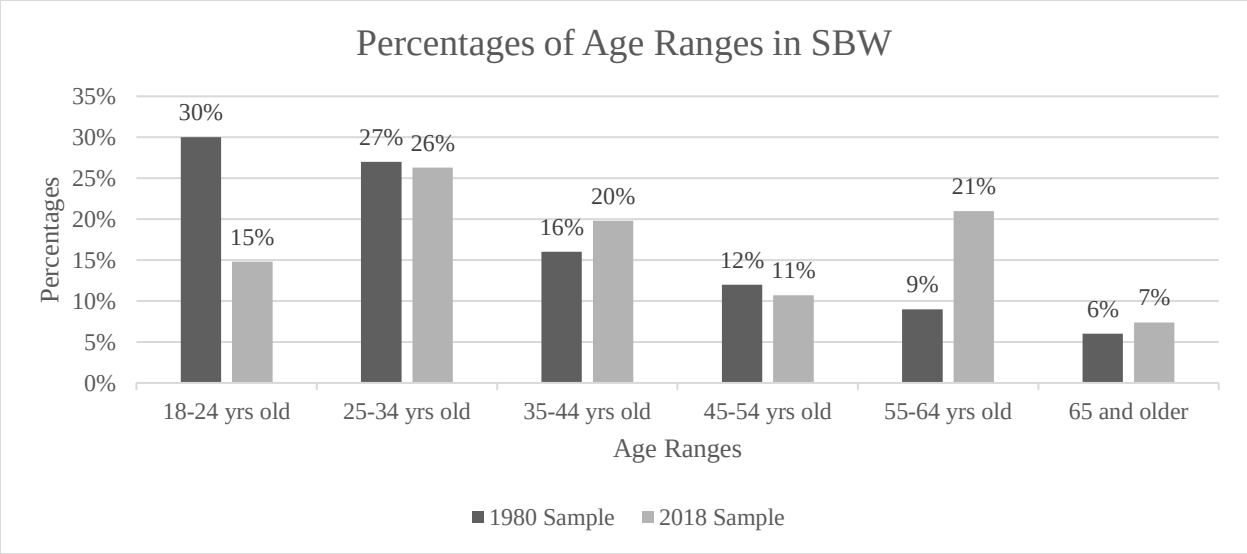
The Lucas (1980) study does not report exact numbers for the distribution of male versus female visitors, instead stating "Most visitors are male… In all other areas between 70 and 80 percent of the visitors are male." (Lucas, 1980, p. 48). The percent of male visitors in Lucas (1980) is much higher than in this study where 51.1% were female and 48.9 % were male. A more recent study of visitors to the Bob Marshall Wilderness Complex (BMWC) also reports that 71% of the sample was male with 29% being female (Whitmore et al., 2005). This is quite a dramatic shift in demographics and suggests the number of females found in this study to be abnormal. It may also be the case that more women responded to the current survey. The high percentage of female respondents in this study may also be a function of urban proximity and trailhead selection as noted earlier in this chapter.

Age

Comparing the age distribution with the Lucas (1980) study, the age range categories differ slightly in that Lucas (1980) recorded 16-20 year olds and 21-24 year olds as two separate groups and lumped the age ranges of those 65 years and older into one category. For this comparison the 16-20 years old category and the 21-24 years old from the Lucas (1980) study were combined. The age ranges from 25 years old to 54 years old are fairly consistent across both sample populations with the largest difference being only 3.8% higher in this study for the

35 to 44 years old category than in the Lucas (1980) study. The findings differ in both the 18-24 age range and the 55-64 age range. The Lucas (1980) study saw 15.2% more of his sample comprising this age range. This however may be a result that the age range of 16-20 year olds made up 17% of the 1980 sample population. 21-24 year olds measured at 13% which is more similar to this study's sample population of 14.8%. There are also discrepancies in the 55-64 year age range with the Lucas (1980) sample comprising 9% of respondents while this study saw an increase in that age range to 21%. The age range of 65 years and older was quite similar with 6% of the Lucas (1980) sample comprising that age range, where the current study found 7.4% of the sample reporting being age 65 years or older. Figure 4.6 shows the comparison of age ranges across the Lucas (1980) sample with the current study.

Figure 4.6: Comparison of Percentages of Age Ranges in Selway-Bitterroot Wilderness

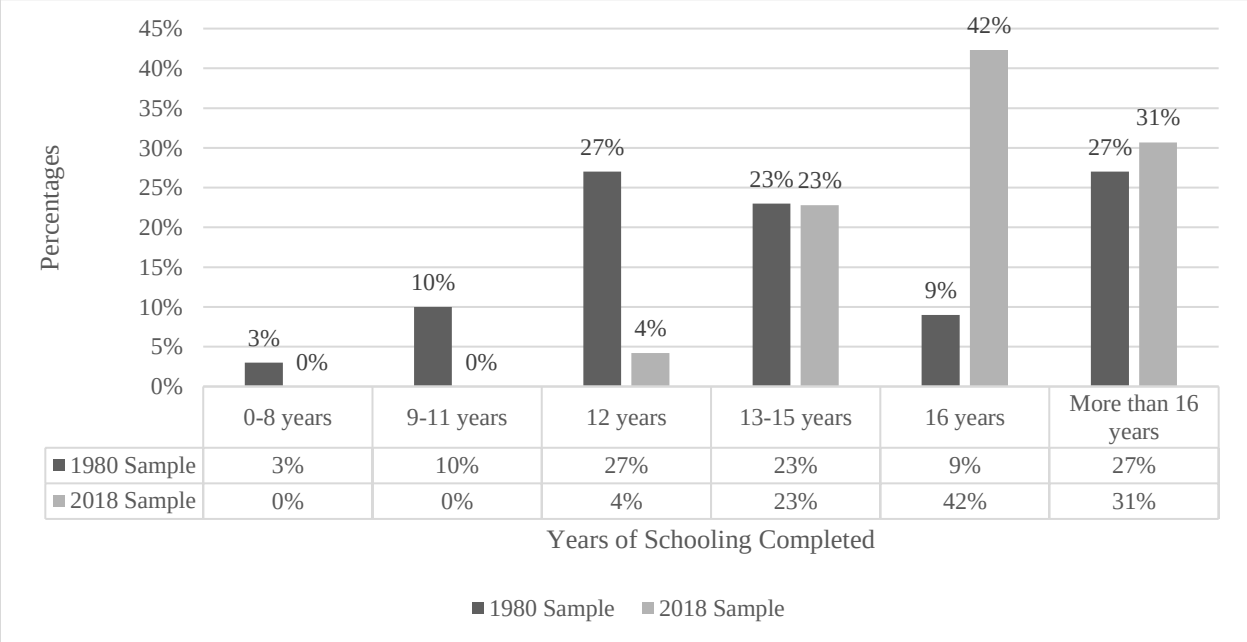


Educational Attainment

When comparing this study with the Lucas (1980) study, the educational attainment was measured slightly differently. Comparisons can still be made, and the most notable difference is seen in the low categories. The sample in 1980 reports 40% of the sample having completed high

school or less while this study saw only 4% of respondents having only completed high school. This is a remarkable difference suggesting that wilderness visitor education levels have increased since 1980. Yet state-of-knowledge reviews conducted by Roggenbuck and Lucas (1987) show that wilderness visitor education levels have always been higher than national averages. When we examine those who are still attending school past high school the numbers are nearly identical with 23% of the 1980 sample versus 23% in this current study. The case is similar with those who have completed more than 16 years of schooling with 27% of the sample in 1980 versus 31% of the current sample population completing more than college level course education. We again see a large difference of those with college degrees with only 9% of the 1980 sample completing 16 years of education versus 42.3 % of the current sample population holding a college degree. The comparison between Lucas (1980) and the current study can be seen in figure 4.7.

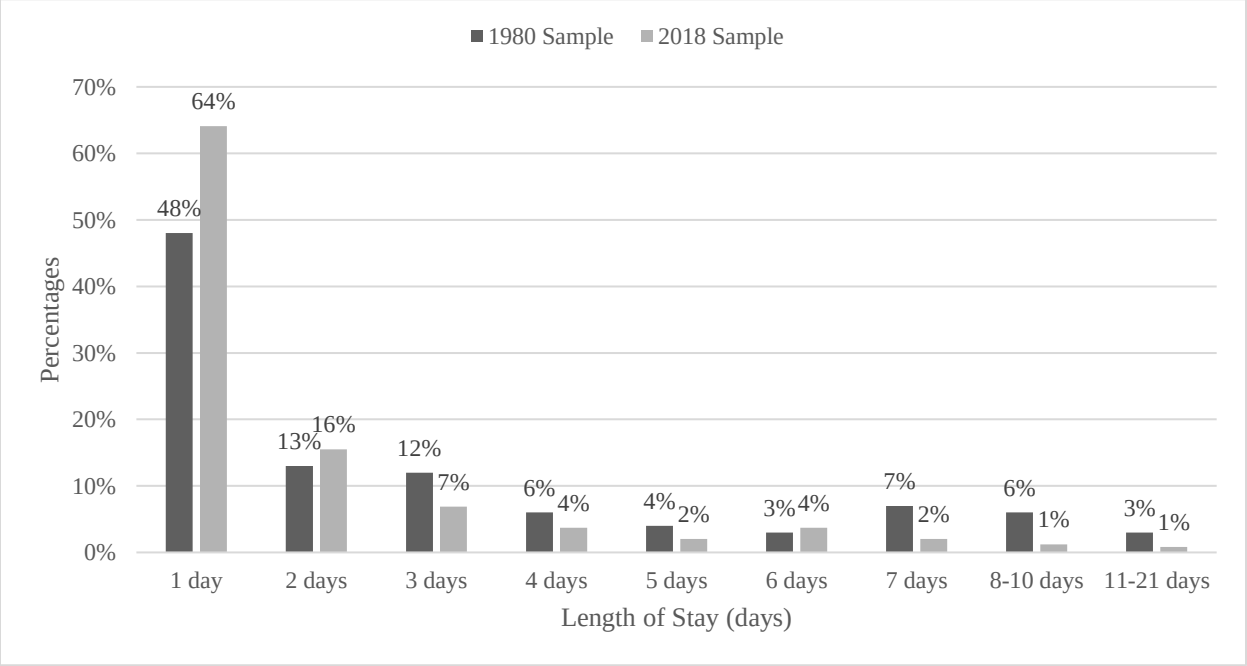
Figure 4.7: Comparison of Years of Schooling Completed in Selway-Bitterroot Wilderness



Length of Stay

Lucas (1980) reports and average stay of 2.9 days with a standard error of .31 versus 1.97 days with a standard error of .11 for this study's sample. The percentage of day visitors is higher in this study's sample population with 64% of respondents being day visitors versus 48% in the Lucas (1980) study. This may be a function of trailhead selection because this study sampled some trailheads that were urban proximate and primarily used for day hikes such as the St. Mary Lookout trail. When comparing the other categories with Lucas (1980) all length of stay category percentages deviate less than 5%. This suggests that this study's respondents are staying similar lengths of time across categories with those in Lucas (1980) when comparing overnight visitation. While lengths of stay are similar there does seem to be a decline in the amount of the sample population staying overnight compared the Lucas (1980) study. The distribution of the comparison of length of stay between Lucas (1980) and this study can be seen in figure 4.8.

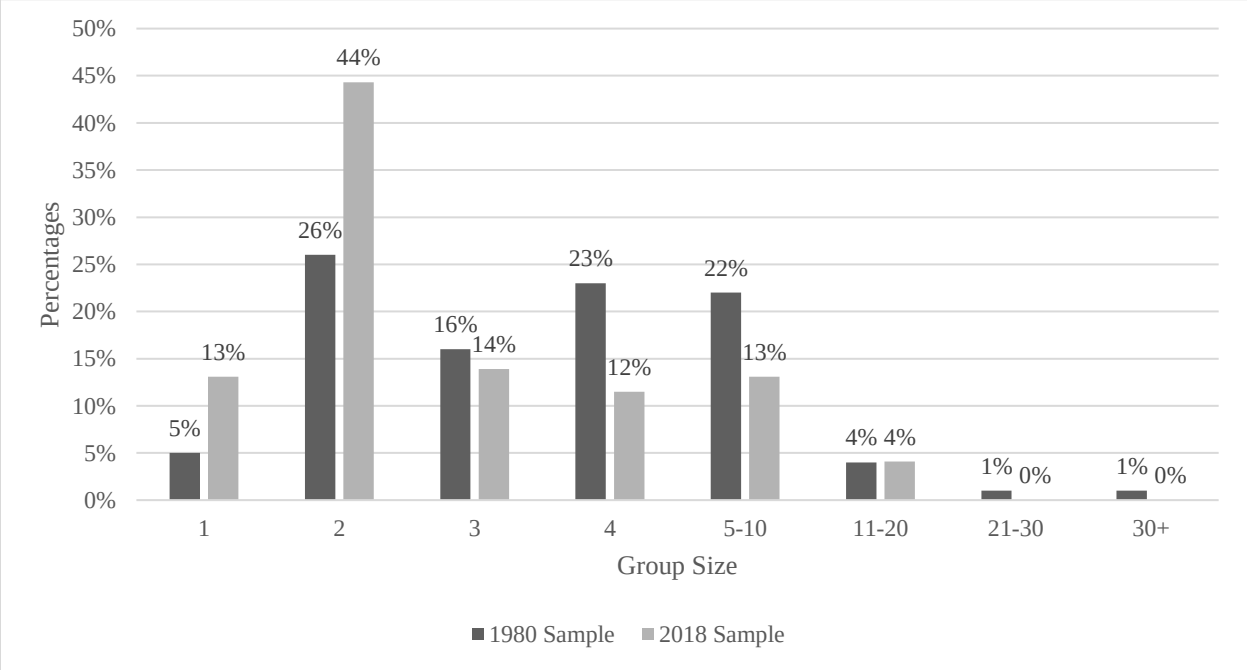
Figure 4.8: Comparison of Length of Stay in Selway-Bitterroot Wilderness



Group Size

The average group size in the Lucas (1980) study was 4.5 people with a standard error of .38 compared with 3.1 people with a standard error .16. The prevalence of 2 group parties increased by nearly 20 percent in this study compared with Lucas (1980). The percentage of solo groups also increased by 8% in this study as compared with Lucas (1980). Overall the data in this study suggests that group size is declining. There is similarity between the studies in that the vast majority of groups contain 5 people or less, 94% in the Lucas (1980) study and 90% in this study. The comparison of group size between the 1980 stud and this study can be seen on the following page in figure 4.9.

Figure 4.9: Comparison of Group Size in Selway-Bitterroot Wilderness



Method of Travel

Both studies saw hiking as the most common method of travel, however the Lucas (1980) study reports that 20% or individual visitors were on horseback compared with only 6.1% in this study. The other category in the Lucas (1980) study was comprised of boaters who were floating the Selway River, this study did not attempt to sample rafting parties. The other category for the 2018 sample population was comprised of trail runners, which is a relatively new activity or mode of travel in wilderness areas. This may again be attributed to trailhead selection although it is difficult to know whether it is a trend or a function of sampling differences.

Table 4.12: Comparison of Method of Travel in Selway-Bitterroot Wilderness

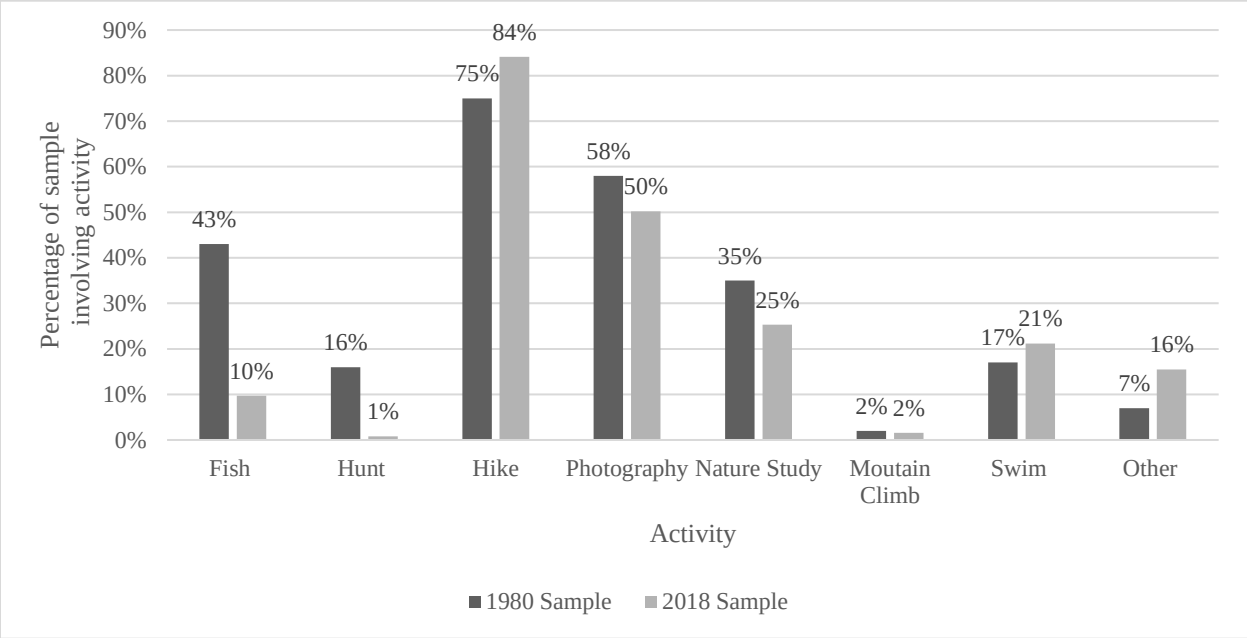
	Hike	Horseback	Hike with pack stock	Other
1980 Sample	70%	20%	6%	5%
2018 Sample	91%	6%	0%	3%

Activity

As noted in the Lucas (1980) study wilderness trips are not usually single activity visits and most individuals participate in more than one activity. This continues to be the case as most individuals selected numerous activities in this study. The activity categories between the two studies were slightly different and the categories from the Lucas (1980) study were used for ease of comparison. As seen in figure 4.10, all categories with the exception of fishing and hunting are within 10% of participation by the sample population in the Lucas (1980) study. It appears as though approximately the same amount of the sample is participating in the same activities. There is a marked reduction in the percent of the sample who are fishing and hunting in this study compared with the Lucas (1980) study. One explanation may be that this study did not continue sampling into the fall season when most hunting occurs and therefore this number may be unrepresentative of the sample population in this respect. According to the National Survey of

Fishing, Hunting, and Wildlife-Associated Recreation (2016) fishing and hunting participation has not seen a decrease similar to the numbers reported in this study which again may be a function of sampling methodology.

Figure 4.10: Comparison of Activity Participation in Selway-Bitterroot Wilderness

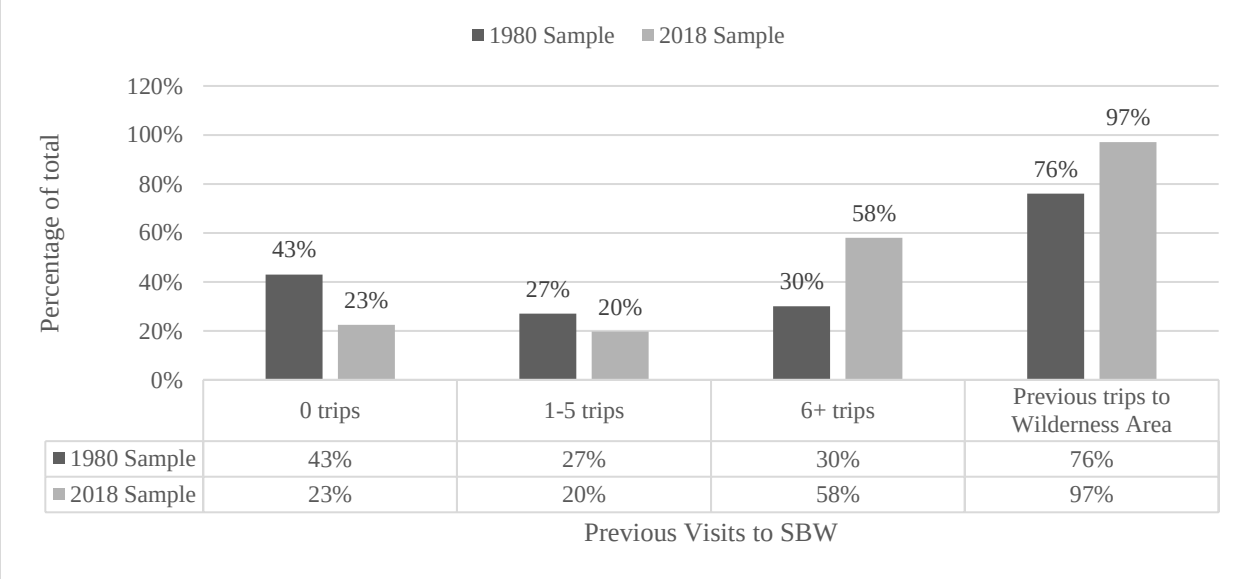


Previous Experience in SBW

As seen in figure 4.11, the 1980 study reported 57% of respondents having made previous trips to the SBW, while 43% were first time visitors. In this study 77% of respondents report having visited the SBW while only 23% were first time visitors. Those respondents with more than 6 trips have increased by nearly 30% since the 1980 study and this study also sees an increase in the percentage of respondents who have visited a wilderness area prior to this trip with 97% of respondents reporting previous wilderness visitation, compared to 76% in the Lucas (1980) study. This may be explained by the high percentage of Montana residents in this study

who have large and numerous wilderness areas in relatively close proximity to urban centers such as Missoula.

Figure 4.11: Comparison of Percentage of Visitors with Previous Experience in Selway-Bitterroot Wilderness



4.4 – Importance and Satisfaction of Setting Attributes

In an effort to understand what setting attributes may be important to opportunities to have an unconfined wilderness experience, respondents were asked to rank the importance of 13 different wilderness setting attributes. Level of importance was measured on a 5 point categorical scale – 1 (not at all important); 5(extremely important), with the option to select "not sure". This portion of the survey attempted to identify setting attributes or conditions that may be important to wilderness visitor's opportunities for unconfined wilderness experiences. In addition to rating importance of setting attributes, satisfaction with the same conditions was also measured on a 5 point categorical scale – 1 (not satisfied); 5 (extremely satisfied).

Table 4.13 displays the distribution of responses of importance of setting attributes for opportunities to have unconfined wilderness experiences. The items in the table are presented in the order they appeared in the survey. The exact wording used in the survey is presented in the table. The purpose of asking these questions was to compare importance ratings with satisfaction ratings to determine if the respondent was satisfied with the setting attributes (conditions) on their trip. If respondents were not satisfied with the conditions these may be areas that managers can focus on when planning and making decisions.

Table 4.13: Distribution of Respondent Ratings - Importance of Setting Attributes

Setting Attribute	N	Not at all important	Slightly important	Moderately important	Very important	Extremely important	Not Sure
The ability to have a campfire	244	**59** (24.1%)	**49** (20.0%)	**58** (23.7%)	**52** (21.2%)	**25** (10.2%)	**1** (0.4 %)
Having no trees damaged in your campsite	243	**59** (24.1%)	**39** (15.9%)	**61** (24.9%)	**48** (19.6%)	**24** (9.8%)	**12** (4.9%)
Not seeing mileage signs	244	**115** (46.9%)	**48** (19.6%)	**41** (16.7%)	**25** (10.2%)	**10** (4.1%)	**5** (2.0%)
Having trails that are completely primitive	243	**123** (50.2%)	**63** (25.7%)	**39** (15.9%)	**8** (3.3%)	**4** (1.6%)	**6** (2.4%)
No permit is required	244	**33** (13.5%)	**31** (12.7%)	**46** (18.8%)	**58** (23.7%)	**71** (29.0%)	**5** (2.0%)
Not seeing regulation signs	243	**82** (33.5%)	**56** (22.9%)	**56** (22.9%)	**22** (9.0%)	**16** (6.5%)	**11** (4.5%)
Not seeing other groups	242	**28** (11.4%)	**66** (26.9%)	**83** (33.9%)	**45** (18.4%)	**18** (7.3%)	**2** (0.8%)
Having campsite choices that are out of sight and sound of others	244	**6** (2.4%)	**15** (6.1%)	**60** (24.5%)	**96** (39.2%)	**64** (26.1 %)	**3** (1.2%)
Not having restrictions placed on where you can camp	244	**44** (18.0%)	**52** (21.2%)	**73** (29.8%)	**43** (17.6%)	**28** (11.4%)	**4** (1.6%)
Not having groups pass within sight and sound of your camp	244	**25** (10.2%)	**57** (23.3%)	**62** (25.3%)	**64** (26.1%)	**34** (13.9%)	**2** (0.8%)
Not having restrictions placed on where you can travel	244	**16** (6.5%)	**53** (21.6%)	**70** (28.6%)	**65** (26.5%)	**38** (15.5%)	**2** (0.8%)
Not having other groups camping within sight and sound of your camp	244	**14** (5.7%)	**41** (16.7%)	**63** (25.7%)	**69** (28.2%)	**55** (22.4%)	**2** (0.8%)
Seeing mileage signs	243	**110** (44.9%)	**47** (19.2%)	**54** (22.0%)	**23** (9.4%)	**4** (1.6%)	**5** (2.0%)

* Lead in question: "In general, how important are each of the following conditions to your opportunity to have an unconfined wilderness experience?"
Note: N = number of respondents
Note: First bolded number in cell is the number of responses for the category followed by the percentage of total in parenthesis.

When examining the means of the importance of setting attributes, all items received responses that ranged from 1 (not at all important) to 5 (extremely important). The highest mean score (3.82) was for the item “Having campsite choices out of sight and sound of others”, while the lowest mean score (1.76) was for the item “having trails that are completely primitive”. As presented in table 4.13 above this item also had 50.2% of respondents rate this condition as not at all important.

Table 4.14: Descending Mean Response to Importance of Setting Attributes

Setting Attribute	N	Min	Max	Mean	Std. Deviation
Having campsite choices that are out of sight and sound of others	241	1	5	3.82	.979
Not having other groups camping within sight and sound of your camp	242	1	5	3.45	1.18
No permit is required	239	1	5	3.43	1.39
Not having restrictions placed on where you can travel	242	1	5	3.23	1.15
Not having groups pass within sight and sound of your camp	242	1	5	3.10	1.21
Not having restriction placed on where you can camp	240	1	5	2.83	1.25
Not seeing other groups	240	1	5	2.83	1.09
Having no trees damaged in your campsite	231	1	5	2.74	1.32
The ability to have a campfire	243	1	5	2.73	1.31
Not seeing regulation signs	232	1	5	2.28	1.23
Not seeing mileage signs	239	1	5	2.03	1.20
Seeing mileage signs	238	1	5	2.01	1.11
Having trails that are completely primitive	237	1	5	1.76	.958

* Lead in question: “In general, how important are each of the following conditions to your opportunity to have an unconfined wilderness experience?”

Note: response items were 1 (not at all important) to 5 (extremely important)

As stated, respondents were also asked to rate their satisfaction level with 13 wilderness setting attributes they encountered on their visit. Level of satisfaction was rated on a 5 point

categorical scale ranging from 1 (not satisfied) to 5 (extremely satisfied). Because of the nature of the setting attributes, some item statements did not apply to day visitors and this is reflected in the response category N/A. Table 4.15 displays the ranked responses of satisfaction ratings of setting attributes for opportunities to have unconfined wilderness experiences. The exact wording used in the survey is presented in the table 4.15.

Table 4.15: Distribution of Respondent Ratings - Satisfaction with Setting Attributes

Setting Attribute	N	Extremely dissatisfied	Somewhat dissatisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Extremely satisfied	Not Sure	N/A
The ability to have a campfire	245	1 (0.4%)	2 (0.8%)	62 (25.3%)	32 (13.1%)	66 (26.9%)	10 (4.1%)	72 (29.4%)
Having no trees damaged in your campsite	245	1 (0.4%)	4 (1.6%)	52 (21.2%)	48 (19.6%)	60 (24.5%)	13 (5.3%)	67 (27.3%)
Not seeing mileage signs	245	2 (0.8%)	12 (4.9%)	91 (37.1%)	38 (15.5%)	66 (26.9%)	10 (4.1%)	26 (10.6%)
Having trails that are completely primitive	245	2 (0.8%)	16 (6.5%)	83 (33.9%)	56 (22.9%)	46 (18.8%)	11 (4.5%)	31 (12.7%)
No permit is required	245	1 (0.4%)	1 (0.4%)	26 (10.6%)	24 (9.8%)	166 (67.8%)	5 (2.0%)	22 (9.0%)
Not seeing regulation signs	245	0 (0%)	6 (2.4%)	105 (42.9%)	45 (18.4%)	62 (25.3%)	9 (3.7%)	18 (7.3%)
Not seeing other groups	245	4 (1.6%)	31 (12.7%)	93 (38.0%)	57 (23.3%)	42 (17.1%)	3 (1.2%)	15 (6.1%)
Having campsite choices that are out of sight and sound of others	245	2 (0.8%)	13 (5.3%)	46 (18.8%)	48 (19.6%)	50 (20.4%)	7 (2.9%)	79 (32.2%)
Not having restrictions placed on where you can camp	245	0 (0%)	3 (1.2%)	44 (18.0%)	43 (17.6%)	65 (26.5%)	12 (4.95)	78 (31.8%)
Not having groups pass within sight and sound of your camp	245	3 (1.2%)	13 (5.3%)	57 (23.3%)	43 (17.6%)	46 (18.8%)	7 (2.9%)	76 (31.0%)
Not having restrictions placed on where you can travel	245	0 (0%)	2 (0.8%)	44 (18.07)	57 (23.3%)	118 (48.2%)	7 (2.95)	17 (6.9%)
Not having other groups camping within sight and sound of your camp	245	3 (1.2%)	10 (4.1%)	52 (21.2%)	35 (14.3%)	56 (22.9%)	8 (3.3%)	81 (33.1%)
Seeing mileage signs	245	3 (1.2%)	12 (4.9%)	107 (43.7%)	37 (15.1%)	43 (17.6%)	8 (3.3%)	35 (14.3%)

* Lead in question: “We've just asked you how important the following conditions are to having an unconfined wilderness experience, now rate how satisfied you are with these conditions on your most recent trip to the Selway-Bitterroot Wilderness?”
Note: N = number of respondents
Note: Top number in cell is number of responses for category followed by percentage of total below in parenthesis

When examining the means of the satisfaction with setting attributes, all items except three received responses that ranged from 1 (extremely dissatisfied) to 5 (extremely satisfied). The three items that didn't span the full range received responses from 2 (somewhat dissatisfied) to 5 (extremely satisfied). The highest mean score (4.62) was for the item "No permit is required" while the lowest mean score (3.45) was for the item "Not seeing other groups". We must take care when interpreting these responses because the unequal contributions may have the potential to inflate these mean scores, however the range of variation was captured by all but three items. Since the majority of the items spanned the full range of responses, we would expect fairly accurate mean score computations. It is notable that all mean scores for these items were above the mid-point rating of this scale of 2.5.

Table 4.16: Descending Mean Responses to Satisfaction with Setting Attributes

Setting Attribute	N	Min	Max	Mean	Std. Deviation
No permit is required	218	1	5	4.62	.748
Not having restrictions placed on where you could travel	221	2	5	4.32	.820
Not having restrictions placed on where you could camp	155	2	5	4.10	.881
Having no trees damaged in your campsite	165	1	5	3.98	.914
The ability to have a campfire	163	1	5	3.98	.946
Not having other groups camping within sight and sound of your camp	156	1	5	3.84	1.05
Having campsite choices that are out of sight and sound of others	159	1	5	3.82	1.01
Not seeing regulation signs	218	2	5	3.75	.903
Not seeing mileage signs	209	1	5	3.74	1.00
Not having groups pass within sight and sound of your camp	162	1	5	3.72	1.02
Having trails that are completely primitive	203	1	5	3.63	.953
Seeing mileage signs	202	1	5	3.52	.942
Not seeing other groups	227	1	5	3.45	1.00

* Lead in question: "We've just asked you how important the following conditions are to having an unconfined wilderness experience, now rate how satisfied you are with these conditions on your most recent trip to the Selway-Bitterroot Wilderness?"

* Note: response items were 1 (extremely dissatisfied) to 5 (extremely satisfied)

4.5 – The Perceived Freedom in Leisure Scale

The next section of this study's survey was the administration of the short form version b (Adult version) of the PFL scale. The administration of this scale was novel to visitors of wilderness areas as it has previously been administered in more urban settings and environments. The descending mean responses to the PFL scale can be seen in table 4.17.

Table 4.17: Descending Mean Responses to PFL Short Form (version B)

PFL scale item	N	Min	Max	Mean	Std. Deviation
I usually have a good time when I do wilderness activities	241	1	5	4.78	.551
I usually decide with whom I do wilderness activities	242	1	5	4.72	.586
Sometimes when I do wilderness activities, I get excited about what I am doing	241	1	5	4.66	.612
During my wilderness activities there are often moments when I feel really involved in what I am doing	242	1	5	4.65	.627
I know many wilderness activities that are fun to do	243	1	5	4.56	.674
I can make a wilderness activity as enjoyable as I want it to be	243	1	5	4.55	.631
It is easy for me to pick a wilderness activity to do	243	2	5	4.45	.722
When participating in wilderness activities there are times when I feel really involved in what I am doing	240	2	5	4.37	.703
I have the skills to do wilderness activities in which I want to participate	243	1	5	4.37	.825
When I feel restless I can do wilderness activities to help me calm down	241	1	5	4.33	.865
I am good at the wilderness activities I do with other people	241	2	5	4.30	.749
I am able to be creative during my wilderness activities	242	2	5	4.19	.751
I can make almost any wilderness activity fun for me to do	242	1	5	4.19	.861
I can do things to improve the skills of the people I do wilderness activities with	243	1	5	4.06	.934
I can enable other people to have fun during wilderness activities	242	1	5	4.03	.775
I can make good things happen when I do wilderness activities	241	1	5	4.02	.866
I can do things during a wilderness activity that will enable me to have more fun	242	1	5	4.02	.767
My wilderness activities enable me to get to know other people	243	1	5	3.95	.984
I am good at almost all the wilderness activities I do	241	1	5	3.94	.878
I can do things to make other people enjoy doing wilderness activities with me	240	1	5	3.86	.824
Sometimes during a wilderness activity there are short periods when I feel I can do anything	242	1	5	3.69	1.09
My wilderness activities help me to feel important	243	1	5	3.58	1.07
I can usually persuade people to do wilderness activities with even if they don't want to	241	1	5	3.26	1.04
I can participate in wilderness activities which help me make new friends	242	1	5	3.24	1.10
I can do things during wilderness activities that will make other people like me more	243	1	5	3.23	.762

* Lead in question: "The following section deals with how you feel about your wilderness experiences. Please read each of the following statements and check the response that best reflects your feeling about each item. Please mark your level of agreement with the statements below".
*Note : Response items were 1 (strongly disagree) to 5 (strongly agree)

Within the 25 item scale, 21 items received varied responses that span the full range from 1 (strongly disagree) to 5 (strongly agree). The four items that did not span the full range saw responses range from 2 (somewhat disagree) to 5 (strongly agree). All items saw means above the mid-point of 2.5 with a high mean score of 4.78 for the item "I usually have a good time when I do wilderness activities. The low mean score of 3.23 is associated with the item "I can do things during wilderness activities that will make other people like me more". In scoring individuals on the scale Ellis and Witt (1984) recommend calculating mean scores for the respondent and comparing these scores to others being tested as a way of determining perceived freedom in leisure. When looking for comparisons of PFL scores to aid interpretation of these results a sample of 94 college students performed by Lee and Halberg (1989) recorded the total mean PFL score of their sample at 2.45 which is quite lower than the mean of 4.11 found in this study. This suggests that the current study's sample has a very high leisure functioning. Individual scores were calculated for respondents and will be used in subsequent analysis which will be discussed in the data analysis section.

4.6 – The 20-item Unconfined Wilderness Experience Scale

Before using Principal Components Analysis to further explore the 20-item unconfined wilderness experience scale, the data were examined. Within this section of the survey, respondents were asked to rate the importance of each of the 20 items on a 10-point scale from 0 (not important) to 9 (very important). The numbers in this scale were a continuum and were not strictly associated with a specific importance statement such as 1 being "very unimportant". This allowed more nuanced responses and was meant to allow for specificity of the respondent rating. By using a response scale that did not have specific statements tied to ratings the respondent is more likely to rate items as they see fit. They are not restricted to statements such as 'very

important' which is tied to the specific value of 4. A rating of very important then is allowed to exist on a continuum that may range from 6-8 allowing the respondent to be more specific when selecting a response.

There was a prompt that gave the respondent some information about the Wilderness Act that read "The Wilderness Act of 1964 directs the Forest Service to provide outstanding opportunities for solitude or a primitive and unconfined type of recreation. We are interested in what an unconfined experience feels like for you". In addition to this prompt, the lead-in question stated: "In general, for an unconfined wilderness experience how important is it that you feel like…" The order of the items was randomized to reduce any bias that may have been inherent in question ordering. Table 4.18 shows the descending means and standard deviations of the 20-items.

Table 4.18: Descending Mean Responses to 20 item Unconfined Wilderness Experience Importance Scale

Unconfined Item	N	Min	Max	Mean	Std. Deviation
You can go at your own pace	235	0	9	8.07	1.35
You are free from work responsibilities	233	0	9	7.88	1.88
You make your own schedule	243	0	9	7.74	1.71
You are in wide open spaces	235	0	9	7.65	1.68
You make your own plans	234	0	9	7.62	1.58
You can change your plans	243	0	9	7.61	1.72
You are untethered from email	242	0	9	7.47	2.41
You are untethered from your phone	235	0	9	7.38	2.33
You have the skills to go anywhere you want	240	0	9	7.30	1.85
Your enjoying what your doing so much you lose track of time	243	0	9	7.27	2.02
You can roam wherever you want	242	0	9	7.26	2.08
You feel like you could keep going	234	0	9	7.20	2.00
You see wildlife unexpectedly	243	0	9	7.10	1.94
You are exploring	244	0	9	6.91	1.98
You are going somewhere new	233	0	9	6.54	2.18
You just pack some things and go	233	0	9	6.52	2.41
You make your own way	233	0	9	6.52	2.16
You can explore away from trails	242	0	9	6.46	2.27
You can camp anywhere	233	0	9	6.29	2.39
There are no rules	242	0	9	5.05	2.81

* Lead in question: In general, for an unconfined wilderness experience how important is it that you feel like…
Note: response scale ranged from 0 associated with 'not important' and 9 associated with 'very important'

Within the 20-item scale, all items received responses that spanned the full range from 1 (not important) to 9 (very important). All of the item means were higher than 5, with the highest mean score 8.07 for the item “You can go at your own pace”. The item with the lowest mean score 5.05 was “There are no rules”. As displayed the item standard deviations range from 1.35 to 2.81, the assumption of equal variance will be discussed in subsequent analysis when using this scale. Principal components analysis was then used to explore underlying dimensions of the scale and to explore correlations between item statements. The principal components analysis will be presented subsequently in the next chapter.

4.7 – Summary

In summary, throughout the 8 trailheads sampled from June 1st to August 26th across the western and northern portions of the SBW, this study had a sample size of n = 245 and a response rate 68.4%. Of the sample 51.1% of respondents were female while 48.9% of respondents were male. The age range of respondents saw the largest number in the 25-34 years old range being 26.1% of the sample population. Education demographics saw a very educated wilderness visitor with 95.8% of respondents having completed at least some college level course work. 102 respondents (42.3%) held 4 year degrees. Examining the length of stay, 157 respondents (64.1%) were day visitors while 88 respondents (35.9%) report staying overnight. The longest trip duration was 11 nights. When asked about group size 108 respondents (44.1%) report a group size of 2. The vast majority of the sample population were hikers with 219 respondents (89.4%) claiming hiking as their method of travel. Approximately 64 % of the sample reported a Montana or Idaho zip code as their place of primary residence with 13.1% being from Washington State. Previous wilderness experience in the SWB was high with 190 respondents (77.5%) having previously visited the SBW. Previous wilderness experience

nationally was even higher with 238 respondents (97.1%) having visited a wilderness area prior to this trip. Overall the sample population revealed a very experienced wilderness visitor. When asked about importance of setting attributes for opportunities to have unconfined wilderness experiences “having campsite choices that are out of sight and sound of others” was rated as most important with a mean score of 3.82. Respondents were most satisfied with not having to acquire a permit to visit the wilderness area as this item saw the highest mean score of 4.62 among the satisfaction statements. Unsurprisingly, within the PFL scale the item with the highest mean score was “I usually have a good time when I do wilderness activities”. Finally, when looking at the unconfined scale items going at your own pace rated as the most important item to feeling unconfined with a mean score of 8.07. It seems that the variation within this convenience sample, and the resemblances with the representative sample found in Lucas’s (1980) study, suggests that this sample is appropriate for further analysis and testing of the 20-item unconfined wilderness experience scale.

Chapter 5 Analysis

One of the primary goals of this study was to determine the underlying structure of the unconfined wilderness experience scale and to assess its validity in measuring elements important to an unconfined wilderness experience. To determine underlying structure, exploratory factor analysis using principal components analysis (PCA) was performed on the data. PCA is primarily a data reduction method in which the researcher seeks to explain the most amount of variance accounted for with the fewest number of items. Factor analysis is also used to explore the underlying or latent dimensions of the data. Through this method a large number of items can be reduced and explained through grouped items. These grouped items, or components, can then be used to create component scores which are then used in subsequent analysis to determine if differences exist in the sample population on scale components.

The Statistical Package for the Social Sciences (SPSS), version 25 was used to preform analysis on the dataset. This chapter will explain the procedures and rationale taken within the PCA of this study, and the interpretation of the results that followed. In addition to PCA on the unconfined wilderness experience scale, this chapter will present further analysis using component scores from the PCA with analysis of variance (ANOVA) procedures on other variables measured in the study. Cluster analysis using the K-means method was also used to create clusters of respondents based on the principal component scores. Additionally, K-means cluster analysis was used to create clusters using the previous wilderness experience items as the cluster variate. These clusters of respondents were also used with ANOVA to explore if statistical differences exist between clusters on these and other variables measured in this study.

PCA was chosen over exploratory factor analysis (EFA) for a number or reasons. The first is that EFA solutions can be said to suffer from “factor indeterminacy, which means that for

any individual respondent several different factor scores can be calculated from the factor model results. There is no unique solution" (Hair et al., 1998, p. 102). Also, this study wished to preserve as much variance as possible in the factor model. When employing PCA the total variance between items is considered and communalities between items are initially set to 1. With EFA, specific and error variance is partitioned off from common variance and the communalities between items are set to this common variance value (Hair et al., 1998). In some cases, the communalities are not always estimable or may be invalid, which can require the deletion of variables from the analysis (Hair et al., 1998). Which factor model is more appropriate has been debated considerably, yet empirical research shows that in many cases similar results may be achieved using either method (Hair et al., 1998). Therefore because of the advantages, PCA was chosen as the method of extraction. The first step in the analysis process was to justify the adequacy of the sample when subjected to PCA. To make this determination, the Kaiser-Meyer Olkin (KMO), Bartlett's Test of Sphericity, and Measure of Sampling Adequacy (MSA) were performed prior to PCA. The next step is to determine the number of components to extract. To accomplish this the latent root criterion and scree test results were examined to determine the suggested number of components of the model. Following this examination, orthogonal rotation is performed to simplify interpretation of component structure and help clarify the resulting dimensions. The final step is to investigate each component's internal consistency and correlation among items using Cronbach's alpha and inter-item correlations.

5.1 - Sample Adequacy for PCA

As discussed, the first step in the analysis process was to determine the adequacy of the sample when performing the PCA. This was done using KMO, Bartlett's Test of Sphericity, and

MSA. Visual inspection of the correlation matrix was also performed. KMO and Bartlett's test the null hypothesis of no statistically significant correlation among the items. They provide "the statistical probability that the correlation matrix has significant correlations among at least some of the variables" (Hair et al., 1998, p. 99). Then, in examining the correlation matrix, visual inspection reveals that 10 of the 20 items have correlation values all above .30 indicating that factor analysis or PCA is appropriate.

Bartlett's Test of Sphericity yields a significance test of less than .001. Since we have a significant value, we can assume that sufficient correlation exists in the correlation matrix to proceed with a PCA. To further justify PCA, a 10 to 1 ratio of sample size to items was obtained for the items in the unconfined wilderness experience scale. In other words, for each item included in PCA at least 10 respondents were obtained.

The KMO test of sample size adequacy resulted in a value of .864 indicating adequate sample size. A KMO value of greater than .5 suggests the sample is of adequate size, while a value ranging from .8 to .9 are great (Kaiser, 1974).

Additionally, when justifying the appropriateness of PCA we can look at the MSA. This index ranges from 0-1, reaching 1 when each item is perfectly predicted without error by the other items. This measure can be interpreted with the following guidelines: .80 or above is meritorious, .70 or above middling, .60 or above mediocre, .50 or above miserable, and below .5 unacceptable. In examining the MSA values, 18 out of 20 values are above .80 and the remaining 2 values are above .70 above indicating that PCA is meritorious (Hair et al., 1998). Table 5.1 displays the results of three tests performed.

Table 5.1: KMO, Bartlett's, MSA tests

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.864
Bartlett's test of sphericity	Approx. Chi square	1917.046
	Df	190
	Sig.	<.001
MSA	18/20 values	>.80
	2/20 values	>.70

5.2 – Component Retention

The next step in conducting the PCA was to examine the eigenvalues and total variance explained by the model. When deciding how many components should be retained a number of criteria were considered. The first, and most common, is the Kaiser criterion or latent root criterion which suggests keeping all components with eigenvalues greater than one. However, "there is broad consensus in the literature that this is among the least accurate methods for selecting the number of factors to retain" (Velicer & Jackson, 1990, cited in Costello & Osborne, 2005, p. 2). When using the latent root criteria, 5 components had eigenvalues above 1, yet upon further examination, the 5th component consisted of only two items which had low Cronbach's alpha and internal reliability. The eigenvalue of the 5th component was reported at 1.020, barely meeting the latent root criteria.

As stated, the latent root criterion was used to aid in determining component extraction along with the graphical method using the scree test. The scree test "is used to identify the optimum number of factors that can be extracted before the amount of unique variance begins to dominate the common variance structure" (Hair et al., 1998, p. 104). The recommendation when using the scree test is the point at which the curve first begins to straighten out is considered to indicate the maximum number of factors to extract (Hair et al., 1998).

The scree plot also showed a clear break at the 3rd to 4th component further suggesting that retaining 5 components was an over extraction (see figure 5.1). "Both over-extraction and

under-extraction of factors retained for rotation can have deleterious effects on the results (Costello & Osborne, 2005, p. 2). Based upon further examination a 4-component solution was explored and ultimately kept. The 4-component solution will be used and examined in the rest of the analysis.

In addition to the latent root criteria and scree test, orthogonal rotation was used as it is generally agreed that "orthogonal rotation provides information that offers the most adequate interpretation of the variables under analysis" (Hair et al., 1998, P. 106). Orthogonal rotation clarifies the factor structure which is desirable for interpretation and can provide a theoretically more meaningful factor solution. Oblique rotation was also explored, and the rotation produced nearly identical results to the orthogonal rotation meaning that the components are uncorrelated.

The Varimax rotation method was used to further simplify interpretation of the factor structure. "Varimax tends to give some high factor loadings and some factor loadings near 0 in each column of the factor matrix" (Hair et al., 1998, P. 110). As item-factor correlations "are close to either 1 or -1 this indicates a clear positive or negative association between the item and the factor", thus making interpretation clearer (Hair et al., 1998, P. 110).

To summarize a number of PCA were run using both orthogonal and oblique rotation methods. After rotation, item loading tables were compared and the solution that had the cleanest factor structure, meaning all item loadings above .35, the fewest item cross loadings, and no factors with fewer than three items is said to have the best fit (Costello & Osborne, 2005). This solution was a 4-component solution using Varimax rotation. Table 5.2 presents the total variance explained across all 20 items with the initial eigenvalues.

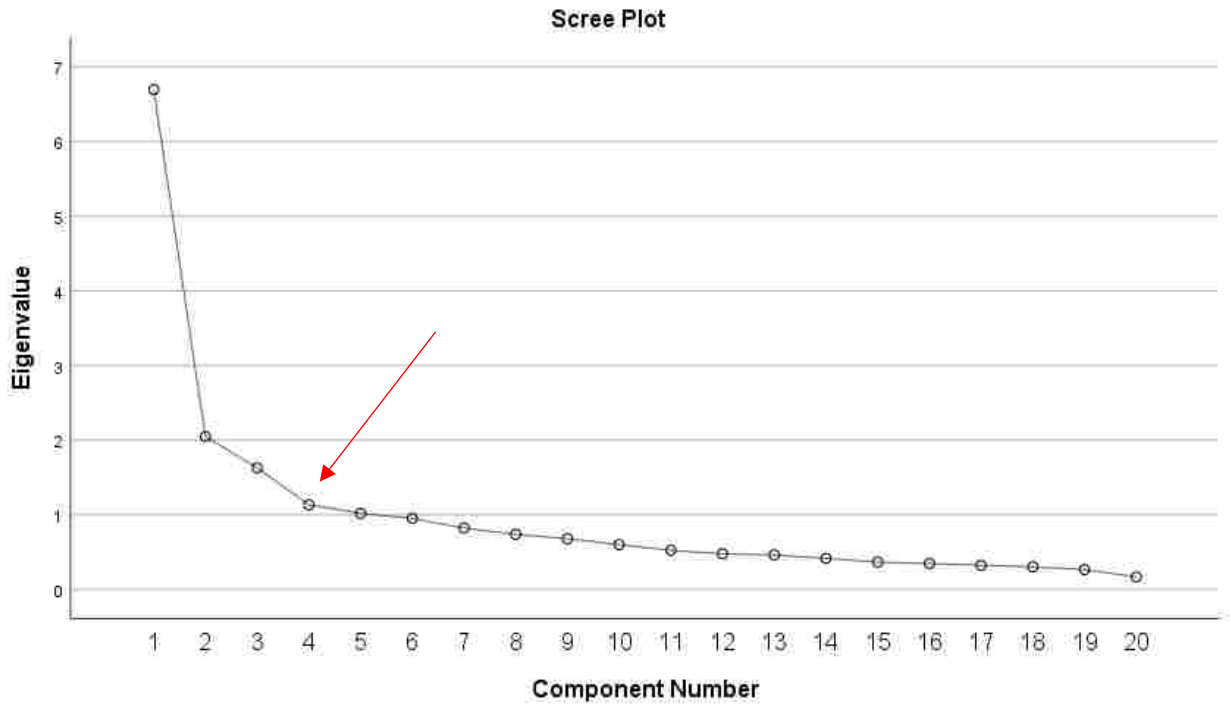
Table 5.2: Total Variance of 20-item Unconfined Wilderness Experience Scale Explained

	Initial Eigenvalues			Extraction Sums of Squares Loadings			Rotation Sums of Squares Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.694	33.468	33.468	6.694	34.468	33.468	3.169	15.847	15.847
2	2.048	10.242	43.710	2.048	10.242	43.710	3.065	15.327	31.174
3	1.629	8.144	51.854	1.629	8.144	51.854	2.825	14.126	45.300
4	1.136	5.680	57.534	1.136	5.680	57.534	2.447	12.233	57.534
5	1.020	5.102	62.635						
6	.955	4.773	67.408						
7	.824	4.120	71.528						
8	.740	3.698	75.226						
9	.681	3.404	78.630						
10	.602	3.008	81.638						
11	.526	2.632	84.270						
12	.479	2.395	86.665						
13	.465	2.323	88.988						
14	.418	2.090	91.079						
15	.369	1.843	92.922						
16	.348	1.742	94.664						
17	.326	1.629	96.294						
18	.305	1.524	97.817						
19	.267	1.337	99.154						
20	.169	.846	100.00						

* Extraction Method: Principal Component Analysis.

The 4 components extracted explain 57.53% of the variance within the 20-item unconfined wilderness experience scale.

Figure 5.1: Scree Test of 20 items



5.3 – Component Interpretation

The next step in the data analysis plan is to determine what the 4 extracted components are working to represent. To aid interpretation the Rotated Component Matrix (using Varimax rotation with Kaiser Normalization) will be examined. This shows how the items have been grouped together as a result of correlations. When interpreting the factors using factor loadings and determining significance, Hair et al. (1998) give the recommendation that for a sample size of 250 only loadings of .35 and higher are considered significant based on alpha .05 significance level and a power level of 80 percent. Given the sample size of 245, loading values over .40 will be considered significant as a conservative measure. In general, the greater the loading score, the more valid the variable is at measuring the component it is within (Tabachnick & Fidell, 2013).

Table 5.3 displays the items and loading scores, grouping items by most influential variable in each component.

Table 5.3: Rotated Component Matrix of Unconfined Wilderness Experience Scale

	Component			
	1	2	3	4
You make your own way	**.783**	.081	.274	.090
There are no rules	**.634**	.088	.073	.206
You just pack some things and go	**.625**	.380	.194	-.018
You can camp anywhere	**.586**	.166	.183	.232
You are in wide open spaces	**.561**	.145	.079	.287
You are untethered from your phone	.051	**.857**	.102	.068
You are untethered from email	.022	**.828**	.078	.171
You are free from work responsibilities	.208	**.610**	**.410**	-.220
Your enjoying what you are doing so much you lose track of time	.356	**.607**	.041	.260
You feel like you could keep going	.369	**.488**	.163	.235
You make your own schedule	.019	.057	**.806**	.217
You make your own plans	.272	.110	**.788**	.154
You can go at your own pace	.267	.279	**.702**	-.031
You can change your plans	.228	.028	**.682**	.341
You can roam wherever you want	**.439**	.013	.156	**.628**
You have the skills to go anywhere you want	.113	.166	.330	**.596**
You see wildlife unexpectedly	.323	.063	.087	**.561**
You are exploring	.015	.369	.209	**.553**
You can explore away from trails	**.506**	-.137	.184	**.518**
You are going somewhere new	.178	**.423**	-.087	**.479**

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Rotation converged in 7 iterations.

As seen in table 5.3 the component structure is reasonably clear. There are only four items with item cross-loadings (loadings above .4 in multiple components). These items are:

“you are free from work responsibilities”; “you can roam wherever you want”; “you can explore away from trails”; and “you are going somewhere new”.

Using PCA this study identifies 4 components to extract within the 20-item unconfined wilderness experience scale. Focused on how the items were grouped, component titles were given to represent the dimension of inquiry among the subscale items within each component. These titles are somewhat arbitrary and intended to ease interpretation as to what each component represents. The four component titles are:

1) Free Choice
2) Untethered From Responsibility
3) Making Own Plans
4) Exploring

The next step in the analysis process examines each component. In this examination the amount of variation that can be explained by the component, the internal consistency of the items, and inter-item correlations will be reviewed.

Component 1 – "Free Choice"

The "Free Choice" component suggests that respondents find the opportunity to make their own choices to be an important aspect of an unconfined wilderness experience. The five items within this component explain 33.46% of the variance within the dataset, Table 5.4 shows the Cronbach's alpha of .759 suggesting that the items are internally consistent, and the scale is reliable. Table 5.5 presents the inter-item correlation matrix which also suggests the correlation between the 5 items are all statistically significant beyond the .01 level. Each show moderate correlations between the five items in this component (between .3 and .6).

Table 5.4: Reliability Statistics – Free Choice

Cronbach's Alpha	Number of Items
.759	5

Table 5.5: Inter-Item Correlations among Free Choice

		Make your own way	No rules	Pack some things and go	Camp anywhere	In wide open spaces
Make your own way	Pearson Correlation	1	.434**	.549**	.448**	.480**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	233	232	231	231	233
No rules	Pearson Correlation		1	.344**	.459**	.230**
	Sig. (2-tailed)			.000	.000	.000
	N		242	232	232	234
Pack some things and go	Pearson Correlation			1	.346**	.364**
	Sig. (2-tailed)				.000	.000
	N			233	231	233
Camp anywhere	Pearson Correlation				1	.304**
	Sig. (2-tailed)					.000
	N				233	233
In wide open spaces	Pearson Correlation					1
	Sig. (2-tailed)					
	N					235

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

Component 2 – "Untethered From Responsibility"

The "Untethered" component suggests that respondents find the opportunity to be away from digital devices, email, and work responsibilities to be important for an unconfined wilderness experience. The 5 items in this component explain a further 10.24% of the variance within the dataset. Table 5.6 shows a Cronbach's alpha of .809 which denotes that the 5 items are internally consistent and that the scale is reliable. Table 5.7 displays the inter-item correlation matrix and also denotes the correlation among the 5 items are statistically significant beyond the .01 level. Again, all inter-item correlations are moderate (between .3 and .6), with the perhaps to be expected higher correlation of .79 between being untethered from phones and being untethered from e-mail.

Table 5.6: Reliability Statistics – Untethered from Responsibility

Cronbach's Alpha	Number of Items
.809	5

Table 5.7: Inter-Item Correlations among Untethered from Responsibility

		Untethered from phone	Untethered from email	Free from work resp.	Lose track of time	Could keep going
Untethered from phone	Pearson Correlation	1	.790**	.477**	.495**	.367**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	235	234	233	235	234
Untethered from email	Pearson Correlation		1	.429**	.505**	.341**
	Sig. (2-tailed)			.000	.000	.000
	N		242	232	242	233
Free from work res.	Pearson Correlation			1	.363**	.341**
	Sig. (2-tailed)				.000	.000
	N			233	233	232
Lose track of time	Pearson Correlation				1	.432**
	Sig. (2-tailed)					.000
	N				243	234
Could keep going	Pearson Correlation					1
	Sig. (2-tailed)					
	N					234

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

Component 3 – "Making Own Plans"

The "Making Own Plans" component suggests that respondents feel that making their own plans and schedules are important to opportunities for an unconfined wilderness experience. The items within this component explain a further 8.14% of the variance within the dataset. Table 5.8 shows a Cronbach's alpha of .826 suggesting high internal consistency with the scale being reliable. Table 5.9 displays the inter-item correlation matrix, again showing that the correlation among the items is statistically significant beyond the .01 level. The inter-item correlations are all moderate (between .3 and .7).

Table 5.8: Reliability Statistics – Making Own Plans

Cronbach's Alpha	Number of Items
.826	4

Table 5.9: Inter-Item Correlations among Making Own Plans

		Make your own schedule	Make your own plans	Go at your own pace	Change your plans
Make your own schedule	Pearson Correlation	1	.621**	.470**	.522**
	Sig. (2-tailed)		.000	.000	.000
	N	243	234	235	243
Make your own plans	Pearson Correlation		1	.565**	.572**
	Sig. (2-tailed)			.000	.000
	N		234	234	234
Go at your own pace	Pearson Correlation			1	.499**
	Sig. (2-tailed)				.000
	N			235	235
Change your plans	Pearson Correlation				1
	Sig. (2-tailed)				
	N				243

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

Component 4 – Exploring

The "Exploring" component suggests that respondents feel the opportunity to explore are important to opportunities for an unconfined wilderness experience. The 6 items in this component explain a further 5.68% of the variance within the dataset. Table 5.10 shows a Cronbach's alpha of .735 suggesting the items are internally consistent and the scale is reliable. Table 5.11 displays the inter-item correlation matrix which shows that the correlation among 5 of the 6 items is statistically significant beyond the .01 level.

Table 5.10: Reliability Statistics – Exploring

Cronbach's Alpha	Number of Items
.735	6

Table 5.11: Inter-Item Correlations among Exploring

		Roam wherever you want	Skills to go anywhere	See wildlife unexpectedly	You are exploring	Explore away from trails	Going somewhere new
Roam wherever you want	Pearson Correlation	1	.448**	.363**	.371**	.548**	.228**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	242	239	242	242	241	233
Skills to go anywhere	Pearson Correlation		1	.322**	.322**	.337**	.312**
	Sig. (2-tailed)			.000	.000	.000	.000
	N		240	240	240	239	230
See wildlife unexpectedly	Pearson Correlation			1	.244**	.440**	.248**
	Sig. (2-tailed)				.000	.000	.000
	N			243	243	242	233
You are exploring	Pearson Correlation				1	.202**	.345**
	Sig. (2-tailed)					.002	.000
	N				244	242	233
Explore away from trails	Pearson Correlation					1	.138*
	Sig. (2-tailed)						.035
	N					242	232
Going somewhere new	Pearson Correlation						1
	Sig. (2-tailed)						
	N						233

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the .05 level (2-tailed).

One important note is that within this component we have multiple correlation scores fall below the .30 level which suggests a weaker relationship (but still statistically significant) between: going somewhere new/roam wherever you want; you are exploring/see wildlife unexpectedly; going somewhere new/see wildlife unexpectedly; explore away from trails/you are exploring; and going somewhere new/explore away from trails. What these lower correlations suggest is that the items in this component are not as strongly related to each other and may be working to represent similar but different dimensions. The item "explore away from trails" has the lowest inter-item correlation score of .138 and thus needs justification for retention. First, when looking at item-total statistics the Cronbach's Alpha if this item is deleted falls to .691, which is lower than desired. Second the inter-item correlation between the items "explore away from trails" and "going somewhere new" although low is still statistically significant at the .05 level.

5.4 – K-Means Cluster Analysis on PCA Scores

As a part of the PCA, factor scores were saved using the Bartlett method for constructing factor scores. "Factor scores are composite variables which provide information about an individual's placement on the factor(s)" (Distefano, Zhu, & Mindrila, 2009, p. 1). There are several methods for constructing factor scores and the Bartlett method, considered a "refined method" was chosen for this study (Distefano, Zhu, & Mindrila, 2009). "Refined procedures may be applied when both principal components and common factor extraction methods are used with EFA. Resulting factor scores are linear combinations of the observed variables which consider what is shared between the item and the factor (i.e., shared variance) and what is not measured (i.e., the uniqueness or error term variance)" (Gorsuch, 1983, as cited in (Distefano, Zhu, & Mindrila, 2009, p.3). "The most common refined methods use standardized information to create

factor scores, producing standardized scores similar to a Z-score metric, where values range from approximately -3.0 to +3.0" (Distefano, Zhu, & Mindrila, 2009, p.3).

"With Bartlett's approach, only the shared (i.e., common) factors have an impact on factor scores. The sum of squared components for the "error" factors (i.e., unique factors) across the set of variables is minimized and resulting factor scores are highly correlated to their corresponding factor and not with other factors." (Distefano, Zhu, & Mindrila, 2009, p.4). The first reason for using the Bartlett method for factor score construction in this study is, when compared to the regression method the factor scores produced were nearly identical. The resulting factor scores have a mean of 0 and a standard deviation of the squared multiple correlation between items and the factor. The Bartlett method also produces unbiased estimates of factor scores, and, in an orthogonal solution factor scores are not correlated with other factors which demonstrates univocality (Distefano, Zhu, & Mindrila, 2009). Univocality is the extent to which factor scores are adequately or insufficiently correlated with other factors in the same analysis (Distefano, Zhu, & Mindrila, 2009). The Bartlett procedure also produces high validity estimates between factor scores and the factor. High validity means evidence of correlational relationships between factor scores and factors. When discussing factor scores in subsequent chapters and subsections this study may use the term component score, as the extraction method used in this study was principal components rather than true factor analysis.

Following the construction of factor scores, Cluster analysis using K-means clustering was performed on the factor scores. 2, 3, and 4 cluster solutions were explored and the clearest solution with best differentiation between clusters resulted in a 3-cluster solution. Best differentiation was determined by: (1) furthest Euclidean distance of cluster centroids from each other and (2) greatest homogeneity within clusters with maximum heterogeneity between

clusters. Table 5.12 displays the distance between cluster centroids with number of respondents in each cluster.

Table 5.12: Euclidean Distances between Final Cluster Centers Created from Component Scores

Cluster	1	2	3	N of Cluster
1	0	1.854	2.224	142
2		0	2.591	64
3			0	39
Total				245

* N = number of respondents

Figure 5.2 shows a 3-dimensional scatterplot of the factor score cluster groupings. Although somewhat difficult to interpret there seems to be fairly clear differentiation between the clusters by factor scores on components 1, 2, and 3. Cluster 1, the largest cluster has the clearest density or homogeneity within. Cluster 3 is clearly more dispersed, however it is fairly clear that respondents in cluster 3 standout from those in cluster 1 and 2.

There was 1 outlier, case 147, which presented challenges with the cluster analysis. This case repeatedly constituted its own cluster and when looking at the responses provided to the items in the 20-item unconfined wilderness experience scale 9 out of the 20 items were ranked as 0, or not important to feeling unconfined. Additionally, 4 out of 20 items were ranked as 9 or very important to feeling unconfined. No other respondent had responses that were so polarized and thus this case was very different from all others. While it may be that a population segment was missed because of sampling methods, and other visitors who hold similar feelings about what is important to feeling unconfined exist, but were not captured in this study, it is somewhat unlikely. The decision was made to exclude this case from the cluster analysis.

Then the means of the factor scores were compared across the 3-cluster solution. Table 5.13 displays the mean factor scores for the three clusters.

Table 5.13: Mean Factor Score of Clusters

	Component Title			
Cluster number	Free Choice	Untethered from Responsibility	Making Own Plans	Exploring
1	.441	.354	.167	.297
2	-1.11	.170	.183	-.743
3	.248	-1.61	-.598	.140

One note that must be made apparent is the way that SPSS version 25 treats missing values when computing factor scores. If there is any missing value, the whole observation is not included and therefore does not record a factor score for the respondent. When initial analysis was performed using this method the sample N dropped from 245 to 219 due to missing values. One way to treat missing values in order to preserve cases is to replace missing values with the mean for just that missing item. This method was employed and resulted in little change in mean factor scores across clusters and is presented in table 5.14.

Table 5.14: Mean factor Scores (missing values replaced with mean) of Clusters

	Component			
Cluster Number	Free Choice	Untethered from Responsibility	Making Own Plans	Exploring
1	.429	.340	.172	.314
2	-1.01	.157	.243	-.838
3	.090	-1.49	-1.02	.231

Following the computation of mean factor scores by cluster, labels were then assigned for scores on the associated component to help with interpretation. The ranges of the scores are as follows:

Table 5.15: Labels Assigned to Mean Factor Score Ranges of Clusters

Label	Score
Extremely High	< 1.0
Very High	1.0 to .6
High	.6 to .3
Medium	.3 to -.3
Low	-.3 to -.6
Very Low	-.6 to -1.0
Extremely Low	> -1.0

Table 5.16 shows the categorical distribution of mean factor scores by cluster membership.

Table 5.16: Mean Factor Scores (missing values replaced with mean) of Clusters

Cluster Number	Free Choice	Untethered from Responsibility	Making Own Plans	Exploring
1	High	High	Medium	High
2	Very Low	Medium	Medium	Very Low
3	Medium	Extremely Low	Extremely Low	Medium

Cluster one has notable high values on the “Free Choice” component and the “Untethering From Responsibility” component. I will term this cluster the “Off to the Woods” cluster of visitors. The “Free Choice” component captures the importance of just getting into the wilderness. These people want to make their own way and feel that a relative lack of rules is important to feeling unconfined. They want to pack some things and go, and they feel being able to camp anywhere is important to an unconfined experience. They also want to feel like they’re in wide open spaces for an unconfined experience. There is a spontaneity in this component that differentiates it from the “Exploring” component. This cluster is also the highest on “Untethering From Responsibility”. They feel that being untethered from their phone and e-mail is important

to feeling unconfined. They want to get away from the pressures of work and technological responsibility. Feeling like they could keep going is also important to feeling unconfined and this may be related to being untethered, they want to feel like they don't have to come back if they don't want to. Also related, is the importance of not having to keep track of time to feeling unconfined. They fall as medium on the "Making Own Plans" component and again high on the "Exploring" component. This suggests that feeling like they are exploring, and roaming, and going somewhere new are important to feeling unconfined. They want to see wildlife unexpectedly and explore away from trails. They also feel competent to go where they want even if it is off trail.

Cluster 2 rates very low on the "Free Choice" component and "Exploring" component. I will term this cluster of visitors the "Stick to the Trail" cluster. These visitors typically do not feel that exploring off trail and on their own is very important to feeling unconfined. These visitors may feel that a predictable planned experience can still be unconfined. They don't need to camp anywhere or roam anywhere, the maintained trail and designated campsite still allows for an unconfined experience. They do feel that being away from their phone and e-mail is moderately important and they do want to make their own plans and schedule. This makes sense as they are lower on the "Exploring" and "Free Choice" components. They want a planned experience and feel that despite being planned, it can still be unconfined.

Cluster 3 differs from the other clusters in that these visitors have an extremely low value for the "Untethering From Responsibility" component. I will term this cluster of visitors the "Happy Warriors" cluster. These visitors don't feel that being untethered from phone and e-mail is important to feeling unconfined. These visitors may actually want to be connected during their trip. Feeling like they are free from work responsibilities isn't important to feeling unconfined

while in the wilderness. They also rate as extremely low on the "Making Own Plans" component. Making their own schedule and making their own plans are not important to feeling unconfined. They may be following plans made by someone else in the party or don't have any plans to begin with. They also don't feel that going at their own pace or being able to change their plans are important to feeling unconfined. It should be noted that this is by far the smallest cluster and again should be noted that this was not a representative sample of SBW visitors.

Cross-Tabulations on Characteristics of Clusters

To further explore and validate the 3-cluster solution on the PCA scores, cross-tabulations were performed to examine the visitor and trip characteristics of respondents in each of the clusters. The first cross-tabulation performed was with overnight versus day visitors. When examining differences between cluster membership and *trip length*, the Pearson chi-square test of independence χ^2 (df = 2, n = 245), 1.652, p = .438, shows no statistically significant difference between the clusters on this variable. It appears that no differentiation exists between clusters on whether the trip was a day trip or an overnight trip. That is, similar proportions of day visitors to overnight visitors were found in each of the three clusters.

Table 5.17: PCA Cluster Membership Cross-Tabulated with Day versus Overnight Trip

		Was this trip a day trip or overnight?		Total
		Day Trip	Overnight Trip	
Cluster	Count	**87**	**55**	**142**
"Off to the Woods"	% of Cluster	61.3%	38.7%	100.0%
	Count	**45**	**19**	**64**
"Stick to the Trail"	% of Cluster	70.3%	29.7%	100.0%
	Count	**24**	**15**	**39**
"Happy Warriors"	% of Cluster	61.5%	38.5%	100.0%
Total		**156**	**89**	**245**

The next cross-tabulation performed was with respondent *age* cluster membership. When examining differences between these two variables the Pearson chi square test of independence

reports χ^2 (df = 12, n = 243), 16.875, p = .154, showing no statistically significant difference between age range and cluster membership. Table 5.18 displays the breakdown of age range by cluster membership. Although there is no statistically significant result of the chi square test there are discrepancies between cluster 1 and 3 in two age range categories. Cluster 3 contains the least number of 18-24 year olds, a difference of 11% with cluster 1. Cluster 3 also has a higher percentage of 55-64 year olds with 31.6% versus 15.6% with cluster 1. One note to be made is that chi-square has limitations when cells have fewer than 5 members as is the case with this cross-tabulation and care should be taken when interpreting this test statistic

Table 5.18: PCA Cluster Membership Cross-Tabulated with Age Range of Respondent

		Age range of respondent							
		18-24	25-34	35-44	45-54	55-64	65-74	75-84	Total
Cluster	Count	**23**	**35**	**29**	**17**	**22**	**11**	**4**	**141**
"Off to the Woods"	% of Cluster	16.3%	24.8%	20.6%	12.1%	15.6%	7.8%	2.8%	100%
	Count	**11**	**19**	**12**	**5**	**17**	**0**	**0**	**64**
"Stick to the Trail"	% of Cluster	17.2%	29.7%	18.8%	7.8%	26.6%	0%	0%	100%
	Count	**2**	**10**	**7**	**4**	**12**	**3**	**0**	**38**
"Happy Warriors"	% of Cluster	5.3%	26.3%	18.4%	10.5%	31.6%	7.9%	0%	100%
Total									243

* Percentages report age range within cluster.

Another cross-tabulation preformed was between respondent *mode of travel* and cluster membership. When examining differences between these two variables the Pearson chi square test of independence reports χ^2 (df = 4, n = 242), .573, p = .966 again showing no statistically significant difference between mode of travel and cluster membership. Table 5.19 displays the counts and percentages of cluster membership by mode of travel. It seems that mode of travel had no influence on factor scores that determined cluster membership as with other cross-tabulations. The distribution of mode of travel by cluster membership is fairly even across the

clusters with similar proportions of hikers, stock users, and trail runners in each of the three clusters.

Table 5.19: PCA Cluster Membership Cross-Tabulated with Mode of Travel

		How did you travel on this trip?			Total
		Hiker	Stock	Trail Running	
Cluster	Count	**126**	**10**	**5**	**141**
"Off to the Woods"	% of Cluster	89.4%	7.1%	3.5%	100.0%
	Count	**58**	**3**	**2**	**63**
"Stick to the Trail"	% of Cluster	92.1%	4.8%	3.2%	100.0%
	Count	**35**	**2**	**1**	**38**
"Happy Warriors"	% of Cluster	92.1%	5.3%	2.6%	100.0%
Total	Count	**219**	**15**	**8**	**242**

* Percentages report mode of travel within PCA cluster

The final cross-tabulation performed was between PCA cluster membership and *amount of wilderness experience*. When examining differences between these two variables the Pearson chi square test of independence reports χ^2 (df = 6, n = 244), 2.11, p = .909 showing no statistically significant difference between wilderness experience and cluster membership.

Table 5.20: PCA Cluster Membership Cross-Tabulated with Wilderness Experience Cluster

		Wilderness Experience Cluster				Total
		1	2	3	4	
Cluster	Count	**62**	**29**	**38**	**13**	**142**
"Off to the Woods"	% of cluster	43.7%	20.4%	26.8%	9.2%	100.0%
	Count	**27**	**17**	**15**	**5**	**64**
"Stick to the Trail"	% of cluster	42.2%	26.6%	23.4%	7.8%	100.0%
	Count	**19**	**7**	**10**	**2**	**38**
"Happy Warriors"	% of Cluster	50.0%	18.4%	26.3%	5.3%	100.0%
Total	Count	**108**	**53**	**63**	**20**	**244**

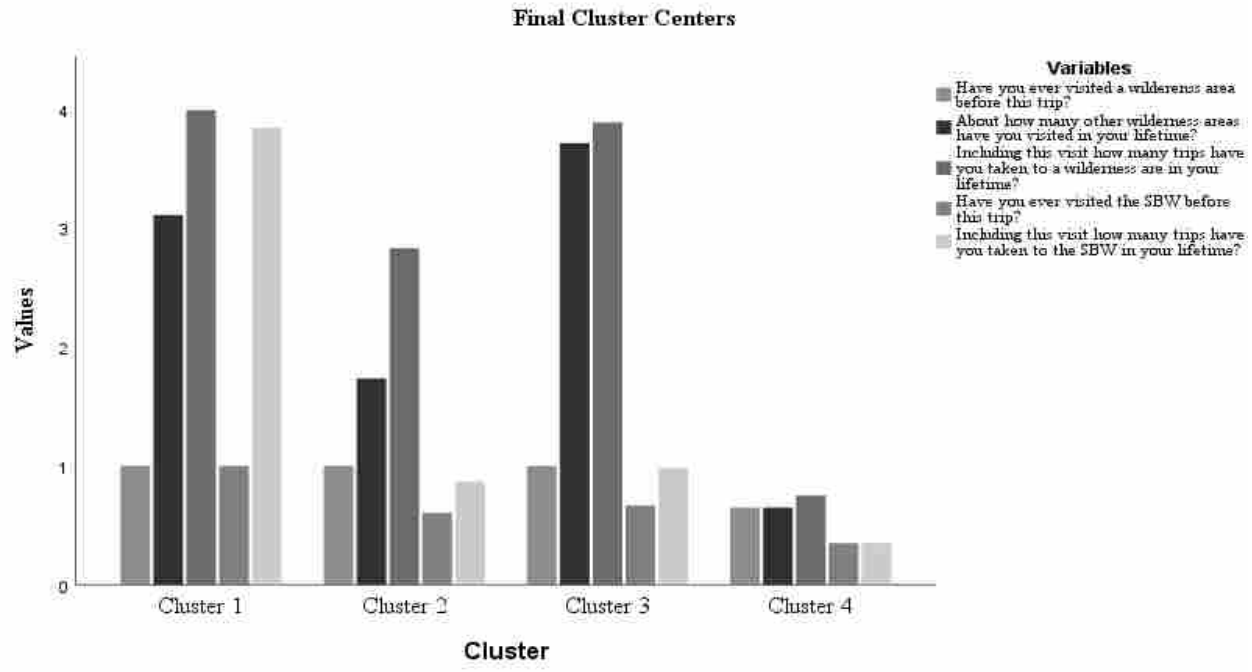
* Percentages report wilderness experience cluster within PCA cluster

Although the cross-tabulations with the unconfined wilderness experience clusters created from the component scores don't show statistical differences within the clusters on the visitor and trip type variables, the clusters still may be valid at differentiating respondent feelings towards unconfined wilderness experiences. What this shows is that feeling unconfined doesn't depend on whether the trip is a day trip or an overnight trip, whether the visitor is a stock user or hiker, that feeling unconfined isn't determined by age, and unconfined wilderness experience clusters have all levels of wilderness experience. What is important to an unconfined experience may be different for each individual, and not determined by trip or visitor demographics.

5.5 – K Means Cluster Analysis on Wilderness Experience Items

In order to calculate an overall wilderness experience variable, cluster analysis using the K-means partitioning method was also used to categorize respondents based on responses to the previous wilderness experience items. A number of cluster solutions were explored for these items including 2, 3, and 4 cluster solutions. The numeric items included in the cluster analysis were: "Have you ever visited a wilderness area before this trip?"; "About how many other wilderness areas have you visited in your lifetime?"; " Including this visit, how many trips have you taken to wilderness areas in your lifetime?"; " Have you ever visited the Selway-Bitterroot Wilderness before this trip?"; and "Including this visit, about how many trips have you taken to the SBW in your lifetime?". The clearest solution that had the greatest homogeneity within and heterogeneity between categories proved to be a 4-cluster solution.

Figure 5.2 Cluster Analysis of Wilderness Experience Variables



When examining the clusters, we can see distinct groups of visitors based on their different levels of wilderness experience. Cluster 1 contains those I will deem very experienced wilderness visitors both nationally and within the study area. They have the highest number of trips taken to wilderness areas and highest number of previous trips into the Selway- Bitterroot Wilderness. They have moderately high values for number of other wilderness areas visited. This value may be a bit lower than cluster three because they spend more time visiting the Selway-Bitterroot Wilderness rather than other wilderness areas.

Cluster 2 contains those individuals I will deem moderately experienced wilderness visitors. They have generally visited other wilderness areas but not as many as those individuals in cluster 1 and 3 as seen by the final cluster center values for the including variables. They have also not taken as many trips as those in cluster 1 and 3. They have visited the SBW before but not many times.

Cluster 3 contains those individuals who are very experienced wilderness visitors but have not visited the SBW wilderness very much, if at all. They have taken a large number of other trips to wilderness areas and have visited a lot of different wilderness areas but have not taken more than 5 trips to the SBW.

Cluster 4 contains those individuals who are novice wilderness visitors: they have the lowest values across all the variables. They have not visited many other wilderness areas or taken many other trips to wilderness areas. These are the individuals who are visiting a wilderness area for the first time.

Table 5.21: Number of Cases in Previous Wilderness Experience Clusters

	Cluster	N
Cluster	1	108.000
	2	53.000
	3	63.000
	4	20.000
Valid		244.000

These wilderness experience clusters will be used as a categorical visitor characteristic variable to determine if differences exist among component scores and wilderness experience. Wilderness experience clusters will also be used to explore importance and satisfaction ratings of setting attributes as more experienced visitors may rate importance and satisfaction differently from less experienced visitors. We can also compare wilderness experience with PFL scores to see if differences exist on these variables.

5.6 – Tests of Variance of PCA Clusters across Condition Evaluations.

In this section, the PCA clusters will be used to compare importance and satisfaction ratings for conditions. Clusters from the PCA (of unconfined factor scores) will also be used to explore possible differences in PFL scores. This will be accomplished by using one-way Analysis of Variance (ANOVA) test, and Multivariate Analysis of Variance (MANOVA) test in order to compare each cluster with mean scores from the other survey items. The hope is to find similarities and differences among the clusters which might lead to a better understanding of the cluster groupings of respondents and their preferences towards conditions. That is, to explore whether preference and evaluation of conditions differ based on what visitors view as most important for an unconfined experience.

PCA Clusters with Importance Items

When examining the PCA clusters with the importance items from section two of the survey with the MANOVA test procedure a few red flags arise in performing the analysis. The first is when testing for equality of the covariance matrices using Box's test. An assumption of MANOVA is that the covariance matrices should be equal, and so if the matrices are equal, we should see a non-significant Box's test result. In the examination of these variables, the Box's M = 257.932, p = .021 is a significant result, therefore we cannot conclude that the covariance matrices are equal across groups. Another concern is that Levene's test also shows univariate equality of variance not being met for a number of the variables. Therefore, the resulting MANOVA and Wilk's Lambda (F = 2.711, df (26,388), p = >.001) should not be trusted to be accurate and will not be discussed. This may be a result of sample size or of item wording and will be discussed further in the discussion chapter of the study.

PCA Clusters with Satisfaction Items

When examining the PCA clusters with the satisfaction items from section two of the survey with the MANOVA test procedure, again the first assumption to check is the equality of the covariance matrices with Box's test. For these items the Box's M = 117.465, p = .502 resulting in the acceptance of the null hypothesis that the covariance matrices are equal across groups. The MANOVA and Wilk's Lambda (F = .957, df (26, 214), p = .529) show no statistically significant mean vector difference on PCA clusters across the satisfaction items (13 items). Said another way, satisfaction ratings were not significantly different across the different PCA clusters. This suggests that respondent satisfaction with conditions (hypothesized to relate to unconfined wilderness experiences) are independent from what dimensions of unconfined the respondent placed the most importance on.

Table 5.22: MANOVA results of Satisfaction ratings across PCA Cluster groupings

		Value	F	Hypothesis df	Error df	Sig.
PCA Cluster	Pillai's Trace	.203	.938	26.000	216.000	.554
	Wilks' Lambda	.803	.957[b]	26.000	214.000	.529
	Hotelling's Trace	.239	.975	26.000	212.000	.504
	Roy's Largest Root	.206	1.708[c]	13.000	108.000	.069

b Exact statistic

c the statistic is an upper bound on F that yields a lower bound on the significance level.

PCA Clusters with PFL Scale

When using MANOVA to analyze the PFL scale items (all items included) with the clusters derived from the PCA scores we again run into problems meeting assumptions of this test procedure. The Box's test of equality of covariance matrices reports a significance value of less than .001 so we cannot assume equality of the covariance matrices. Therefore, the resulting

MANOVA and Wilk's Lambda (F = 2.024, df (50,416), p = >.001) should not be trusted to be accurate and will not be interpreted.

Table 5.23: MANOVA results of PFL scores across PCA Cluster groupings

		Value	F	Hypothesis df	Error df	Sig.
PCA Cluster	Pillai's Trace	.386	1.999	50	418	.000
	Wilks' Lambda	.647	2.024[b]	50	416	.000
	Hotelling's Trace	.495	2.048	50	414	.000
	Roy's Largest Root	.348	2.911[c]	25	209	.000

b Exact statistic

c the statistic is an upper bound on F that yields a lower bound on the significance level.

Table 5.24: PFL Mean Scores across PCA Cluster groupings

Cluster Number	PFL Mean	Std. Deviation	N
1	4.2561	.41157	142
2	3.9447	.49899	64
3	3.8927	.39601	37
Total	4.1188	.46232	243

Note: PFL mean score was calculated then used to compare means across the PCA clusters

5.7 - ANOVA using Unconfined Experience Scale Component Scores

In this section each of the four principal components of the 20-item unconfined wilderness experience scale will be explored further to determine how sub-groups within the sample population differ across each of the scale components. ANOVA tests will be used to compare component scores reported towards each of the four components across multiple sub-groups within the sample population.

Free Choice Component

When looking at *length of stay* there was no significant difference (p = .877) between day visitors and overnight visitors when it came to the importance of "Free Choice" for an unconfined experience. Overnight visitors report a mean component score of -.013 while day visitors report a mean component score of .007. This suggests that it doesn't matter whether the

trip is a day trip, or an overnight, “Free Choice” may still be important (or not depending on the visitor), to feeling unconfined during the wilderness experience.

Table 5.25: Comparison of Free Choice Component Scores Across Length of Stay

Length of Stay	Mean	Std. Deviation	N
Day Trip	.007	1.02	156
Overnight Trip	-.013	.968	89
Total	.000	.977	245

Comparing differences across *sex*, there was no significant difference (p = .237) between males and females when it came to “Free Choice”. Males report a mean component score of -.078 while females report a mean component score of .071. As with trip length, it seems “Free Choice” is as important whether the respondent was male or female.

Table 5.26: Comparison of Free Choice Component Scores Across Sex

Sex	Mean	Std. Deviation	N
Female	-.078	1.02	125
Male	.071	.950	118
Total	-.055	.985	243

Across *age* ranges there was a statistically significant difference (p = .006) between age ranges and the “Free Choice” component. Those respondents in the 65-74 and 75 -84 age ranges report higher mean component score suggesting “Free Choice” is more important to older visitors as a component of an unconfined experience. Those in the 75-84 year old age range had the highest mean component scores of .489 while the 18-24 year old had the lowest scores at -.464. However, because the age range categories have such unequal sample sizes and standard deviations it is appropriate to conduct further analysis for this variable. The Hochberg GT2 test, which was designed for multiple comparisons when sample group sizes are unequal replaces the sample size in each group with the harmonic mean of the sample size (Field, 2009). Additionally,

Hochberg's GT 2 was designed to show where the difference lies after a significant result from an ANOVA. When looking at the Hochberg GT2 test statistic we get an overall non-significant result (p = .113), however we do see that the difference in means between 18-24 year olds and 45-54 year olds still yields a significant difference (p = .025) at the .05 level. We may still conclude that older visitors (age range categories 45-54, 65-74, and 75-84) find "Free Choice" as a more important component to the unconfined experience than 18-24 year olds.

Table 5.27: Comparison of Free Choice Component Scores Across Different Age Groups

What is your age?	Mean	Std. Deviation	N
18-24	-.464	1.11	36
25-34	.080	.982	64
35-44	.025	.953	48
45-54	.346	.831	26
55-64	-.207	.928	51
65-74	.461	.617	14
75-84	.489	1.38	4
Total	-.014	.986	243

When looking at *mode of travel* there was not a statistically significant difference (p = .547) between hikers, horseback riders, and trail runners on the "Free Choice" component. However, stock users did report a mean of .277 compared with slight negative mean component scores for the other two modes of travel.

Table 5.28: Comparison of Free Choice Component Scores Across Mode of Travel

How did you travel on this trip?	Mean	Std. Deviation	N
Hiker	-.016	.979	219
Stock	.277	1.17	15
Trail Running	-.031	1.25	8
Total	.001	1.00	242

The last variable tested was with previous wilderness experience, no statistically significant difference (p = .986) was reported between previous wilderness experience cluster

membership and the “Free Choice” component. This suggests that despite different levels of experience, importance of “Free Choice” was very similar across wilderness experience clusters.

Table 5.29: Comparison of Free Choice Component Scores Across Wilderness Experience Clusters

Previous Wilderness Experience Cluster	Mean	Std. Deviation	N
1	-.007	1.04	108
2	.013	.906	53
3	-.047	.947	63
4	.024	1.06	20
Total	-.010	.986	244

Untethered from Responsibility Component

Moving to the “Untethered From Responsibility” component there was no significant difference ($p = .251$) between day visitors and overnight visitors. Day visitors have a mean component score of -.055 while overnight visitors report a mean component score of .097. Although not statistically significant we do see that overnight visitors do rate these conditions as being more important to feeling unconfined than day visitors.

Table 5.30: Comparison of Untethered From Responsibility Component Scores Across Length of Stay

Length of Stay	Mean	Std. Deviation	N
Day Trip	-.055	1.03	156
Overnight Trip	.097	.935	89
Total	.000	.997	245

When looking at *sex* and the “Untethered From Responsibility” component scores there is a significant difference ($p > .001$) between males and females. Females report a mean of .249 while males report a mean of -.242. It seems that untethering from phone and e-mail and being free from work responsibilities are much more important to females than males to feeling unconfined while in wilderness.

Table 5.31: Comparison of Untethered From Responsibility Component Scores Across Sex

Sex	Mean	Std. Deviation	N
Female	.249	.871	125
Male	-.242	1.02	118
Total	.010	.976	243

Across *age* range categories there was a statistically significant difference (p = .009) between age ranges and the "Untethered From Responsibility" component. The age range category of 18-24 year olds have the highest mean component score of .340 while the low score is for 55-64 year olds at -.441. While this suggests that "Untethering From Responsibility" is more important to 18-24 year olds, when Hochberg GT2 post hoc analysis is conducted because of the inequality of sample sizes we again see a reversal of overall significance and a resulting p value of .372. However, we do see that the means between 18-24 year olds and 55-64 year olds still yields a significant difference (p = .004) and suggests that "Untethering From Responsibility" is a more important component of the unconfined experience for 18-24 year olds than for the 55-64 year old age group.

Table 5.32: Comparison of Untethered From Responsibility Component Scores Across Different Age Groups

What is your age?	Mean	Std. Deviation	N
18-24	.340	.702	36
25-34	.153	.930	64
35-44	.058	1.03	48
45-54	-.039	.948	26
55-64	-.441	1.15	51
65-74	.044	.537	14
75-84	.131	.342	4
Total	.010	.976	243

When looking at *mode of travel* and the "Untethered From Responsibility" component there is not a statistically significant difference (p = .471) between hikers, horseback riders, and

trail runners. Looking at the mean component scores for each group hikers score the lowest on this component reporting a mean of -.007, with stock users reporting a mean of .239 and trail runners reporting a mean of .277. So, while not statistically significant stock users and trail runners do find "Untethering From Responsibility" as slightly more important that hikers.

Table 5.33: Comparison of Untethered From Responsibility Component Scores Across Mode of Travel

How did you travel on this trip?	Mean	Std. Deviation	N
Hiker	-.007	.986	219
Stock	.239	.767	15
Trail Running	.277	.866	8
Total	.016	.970	242

Among the different *previous wilderness experience* clusters there is not a statistically significant difference (p = .924) of mean component scores across clusters. Interestingly though the cluster comprised of the least experienced visitors rated highest on the "Untethering from Responsibility" component with a mean component score of .107. The lowest mean component score was reported by those visitors who are both experienced nationally and within the SBW.

Table 5.34: Comparison of Untethered From Responsibility Component Scores Across Wilderness Experience Clusters

Previous Wilderness Experience Cluster	Mean	Std. Deviation	N
1	-.017	.944	108
2	.067	.996	53
3	-.008	1.07	63
4	.107	.809	20
Total	.013	.976	244

"Making Own Plans" Component

Exploring the "Making Own Plans" component with visitor *length of stay* we again see a non-significant difference (p = .070) in mean scores for the "Making Own Plans" component. Day visitors report a mean of .087 while overnight visitors report a mean of -.152. It is interesting that the overnight visitor mean is on average, lower suggesting that making your own schedule and plans and being able to change those plans is less important to feeling unconfined for overnight visitors.

Table 5.35: Comparison of Making Own Plans Component Scores Across Length of Stay

Length of Stay	Mean	Std. Deviation	N
Day Trip	-.055	1.03	156
Overnight Trip	.097	.935	89
Total	.000	.997	245

Looking at *sex* and the "Making Own Plans" component the ANOVA reports a non-significant difference (p = .720) in mean component scores for this variable. Females report a mean component score of .028 and males report a mean component score of -.017. While not statistically significant it does suggest that females may more often place more importance on the items in the "Making Own Plans" component.

Table 5.36: Comparison of Making Own Plans Component Scores Across Sex

Sex	Mean	Std. Deviation	N
Female	.028	1.10	125
Male	-.017	.865	118
Total	.006	.994	243

When examining the "Making Own Plans" component across *age* range categories the result is a non-statistically significant difference (p = .629) across mean component scores for different ages. The highest mean component score is for the 75-84 year olds at .462 and the

lowest score is for 25-34 year olds at -.127. The high mean score for the oldest age range category and non-significant difference may be a result of sample size in that the N of the 75-84 year old category only had 4 respondents. There is also no clean trend in mean scores.

Table 5.37: Comparison of Making Own Plans Component Scores Across Different Age Groups

What is your age?	Mean	Std. Deviation	N
18-24	.225	.811	36
25-34	-.127	1.21	64
35-44	.057	.956	48
45-54	.067	.685	26
55-64	-.056	1.01	51
65-74	-.117	.960	14
75-84	.462	.711	4
Total	.007	.994	243

When looking at the *mode of travel* and "Making Own Plans" component we again see a non-significant (p = .536) difference in mean component scores between these groups. Hikers report a mean of -.002, stock users report a mean of .155 and trail runners report a mean of -.336. As with the "Untethering From Responsibility" component stock users do report the highest mean component score for the "Making Own Plans" component.

Table 5.38: Comparison of Making Own Plans Component Scores Across Mode of Travel

How did you travel on this trip?	Mean	Std. Deviation	N
Hiker	-.002	1.01	219
Stock	.155	.935	15
Trail Running	-.336	.646	8
Total	-.004	1.00	242

Across the different *previous wilderness experience* clusters, we see a non-significant difference (p = .206) in mean component scores for the "Making Own Plans" component. We again see the pattern continue that the least experienced respondents report the highest mean component score of .440 for the "Making Own Plans" component. This suggests that making

their own schedule and plans and going at their own pace is important for them to feel unconfined. This may actually be a function of their lack of experience, as a part of the learning process of wilderness use is making their own schedule and plans. It may be developmental and could be a reason they rate higher on the "Making Own Plans" component.

Table 5.39: Comparison of Making Own Plans Component Scores Across Wilderness Experience Clusters

Previous Wilderness Experience Cluster	Mean	Std. Deviation	N
1	.005	1.11	108
2	-.102	.858	53
3	-.034	.931	63
4	.440	.763	20
Total	.007	.992	244

Exploring Component

Lastly when we look at the "Exploring" component and whether the trip was a day trip or an overnight trip, we see a non-significant difference (p = .087) in mean component scores. Day visitors report a mean component score of -.082 while overnight visitors report a mean of .144. As with many of the other components the mean scores between these two groups are not statistically significant but are different, overnight visitors do place more importance on these component items than day visitors for them to feel unconfined while in wilderness.

Table 5.40: Comparison of Exploring Component Scores Across Length of Stay

Length of Stay	Mean	Std. Deviation	N
Day Trip	-.082	.948	156
Overnight Trip	.144	1.06	89
Total	.000	.997	245

When examining *sex* and the "Exploring" component we see a significant difference (p = .014) between females and males. Males report the higher mean score of .172 while females report a mean score of -.138 suggesting that males place more importance on aspects of

exploring to feeling unconfined while in wilderness than females. It's more important for males to feel like they are exploring, to explore away from trails, to feel like they are going somewhere new, to see wildlife unexpectedly, and to feel like they can roam wherever they want to have the opportunity to feel unconfined.

Table 5.41: Comparison of Exploring Component Scores Across Sex

Sex	Mean	Std. Deviation	N
Female	-.138	1.12	125
Male	.172	.778	118
Total	.012	.984	243

When examining the *age* range categories and the "Exploring" component there is not a significant difference (p = .502) in mean component scores across different ages. The highest mean component score comes from the 65-74 year old category at .408 and the lowest is from the 25-34 year olds at -.160.

Table 5.42: Comparison of Exploring Component Scores Across Different Age Groups

What is your age?	Mean	Std. Deviation	N
18-24	.118	.841	36
25-34	-.160	1.29	64
35-44	.044	.968	48
45-54	.024	.753	26
55-64	.004	.765	51
65-74	.408	.728	14
75-84	.394	.799	4
Total	.017	.980	243

Across *mode of travel* and the "Exploring" component we see a significant difference (p = .048) in mean component scores. Hikers report the lowest mean component score of -.036 while stock users have the highest of .531, trail runners report a mean component score .405. This suggests interestingly that stock users feel items related to "Exploring" are more important

to feeling unconfined than other user types. Although we see a significant finding, in the ANOVA results when the Levene's test is examined it results in a significant finding suggesting that we don't have equality of variance, an assumption of ANOVA. Also, since the group sizes are so unequal, we must examine the post-hoc Games-Howell statistic which is appropriate for unequal sample sizes when equal variances cannot be assumed. The Games-Howell shows that there is a statistical difference (p = .001) between Hikers and Stock Users mean scores on the "Exploring" component.

Table 5.43: Comparison of Exploring Component Scores Across Mode of Travel

How did you travel on this trip?	Mean	Std. Deviation	N
Hiker	-.036	1.00	219
Stock	.531	.436	15
Trail Running	.405	.578	8
Total	.013	.980	242

When looking at the *previous wilderness experience* clusters and the "Exploring" component the result is a non-significant difference (p = .197) in mean component scores across different wilderness experience levels. The highest mean is reported by the least experienced cluster at .168 while the lowest mean component score -.237 is associated with the moderately experienced visitors.

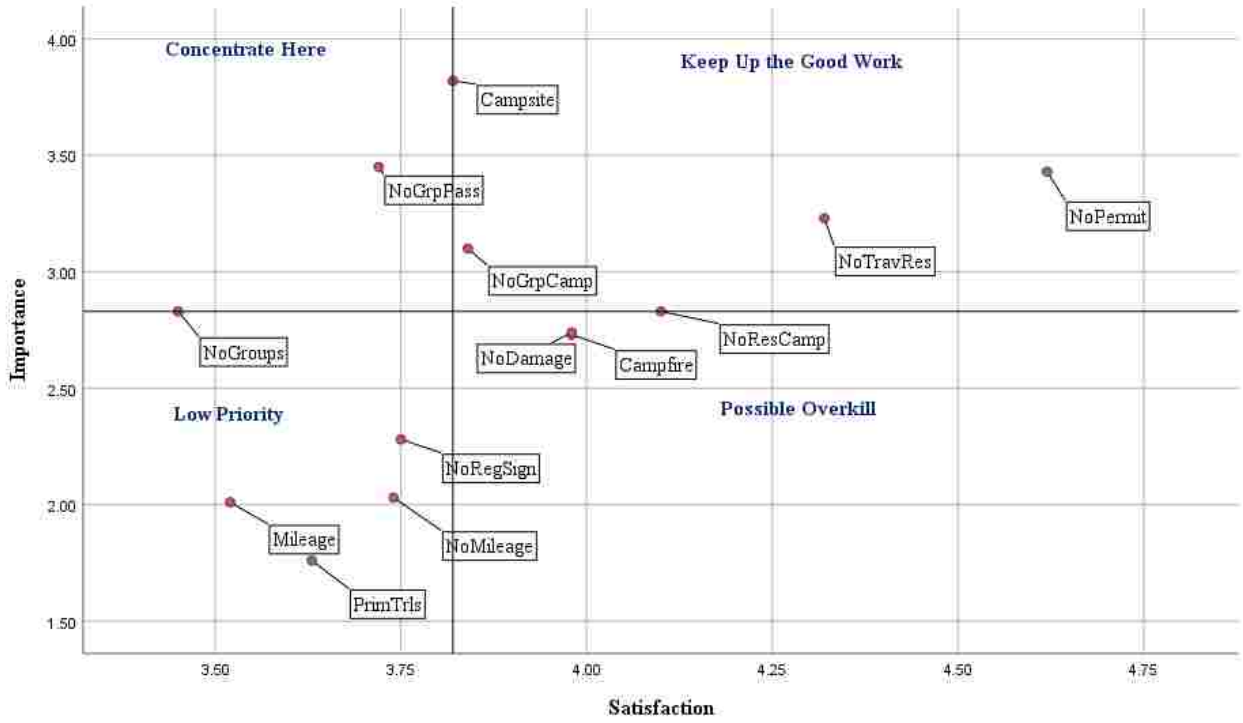
Table 5.44: Comparison of Exploring Component Scores Across Wilderness Experience Clusters

Previous Wilderness Experience Cluster	Mean	Std. Deviation	N
1	.093	.902	108
2	-.237	.990	53
3	.032	1.08	63
4	.168	1.00	20
Total	.011	.982	244

5.8 – Importance and Satisfaction Evaluations

In this section, analysis will be performed on the importance and satisfaction with setting attributes data. Figure 5.3 shows a graphical display of importance of setting attributes on the y axis and satisfaction on the x axis. There are 4 quadrants of the graph, displayed with titles based on the importance and satisfaction groupings. For example, if an item such as "not having other groups pass within sight and sound of your camp" rates as highly important but satisfaction with conditions encountered is low, it is placed in the "concentrate here" quadrant in the upper left of the graph. The reference lines and axis intersection which make up the quadrants are based upon median item ratings. The median was chosen for reference due to recommendations by the Martilla and James (1977) who developed the importance performance analysis method. "Positioning the vertical and horizontal axes on the grid is a matter of judgment. The value of this approach lies in identifying the relative, rather than absolute, levels of importance and performance." (Martilla & James, 1977, p. 79). They also state that median values as a measure of central tendency are theoretically preferable to means because a true interval scale may not exist (Martilla & James, 1977).

Figure 5.3 Importance/Satisfaction Analysis



Item Abbreviation	Full Item Statement
Campfire	The ability to have a campfire
No Damage	Having no trees damaged in your campsite
No Mileage	Not seeing mileage signs
PrimTrls	Having trails that are completely primitive
No Permit	No permit is required
No Reg Sign	Not seeing regulation signs
No Groups	Not seeing other groups
Campsite	Having campsite choices out of sight and sound of others
No Trav Res	Not having restrictions placed on where you can travel
No Grp Camp	Not having other groups camped within sight and sound of your camp
No Res Camp	Not having restrictions placed on where you can camp
No Grp Pass	Not having other groups pass within sight and sound of your camp
Mileage	Seeing mileage signs

Note – Lead in statement for importance was: "In general, how important are each of the following conditions to your opportunity to have an unconfined wilderness experience?"
Note – Lead in statement for satisfaction was: "We've just asked how important the following conditions are to having an unconfined wilderness experience. Now please rate how satisfied you are with these conditions on your most recent trip to the Selway-Bitterroot Wilderness."

As seen in the figure only one item ("not having other groups pass within sight and sound of your camp") solidly lands in the "concentrate here" quadrant, signifying to managers that respondents feel a high importance for this item to feel unconfined yet low satisfaction with conditions experienced during their visit. "Having campsite choices that are out of sight and sound of others" was also rated as highly important with the satisfaction being right on the median making it difficult to differentiate whether visitors were truly satisfied with these conditions during their trip.

Four items fell into the "low priority" quadrant; both items concerning seeing mileage signs, not seeing regulation signs, and having trails that are completely primitive. This suggests that these conditions are not very important to feeling unconfined.

Three items fell in the "possible overkill" quadrant; the ability to have a campfire, having no trees damaged in your campsite, and not having restrictions placed on where you can camp. This suggests that while respondents were satisfied with these conditions, they may also be somewhat unimportant to feeling unconfined while in wilderness. The figure also shows that these items are close to the median importance.

Three items fell into the "keep up the good work" quadrant; not having other groups camped within sight and sound of your camp, not having restrictions placed on where you can travel, and not having to obtain a permit to visit the SBW. This suggests that these conditions are both important to respondents and that they are satisfied with the conditions experienced during their trip.

One interesting note about these results is that all satisfaction averages are above 3.5. The midpoint of the scale which theoretically denotes the cutoff between being satisfied and unsatisfied is 2.5, so we see that respondents were generally very satisfied with the conditions

they experienced on their trip. Borrie and Birzell (2001) note "visitors typically perceive the quality of national parks and wilderness areas as high suggests that results may be somewhat skewed and the range of variation not adequately captured by these measures." They write further that "It is not surprising that visitor evaluation of outdoor recreation experiences is high given the voluntary nature, the high emotional and financial commitment, and the social desirability typically associated with them" (Borrie & Birzell, 2001, p. 31). It is unsurprising then that average satisfaction ratings are all high.

It is also interesting to note the how extreme the average satisfaction ratings are for the items "not having restrictions placed on where you can travel" and "no permit is required". It seems respondents were extremely satisfied with these managerial setting attributes and suggests to managers that these conditions should be maintained. This also suggests that if these setting attributes truly are important to the opportunity to have unconfined experiences then, on average, respondents were able to achieve opportunities for unconfined experiences with respect to these conditions. Generally, these importance-satisfaction results indicate that visitor's expectations are, on average, in-line with the conditions they are experiencing. That is, the conditions rated as important are also rated, on average, as satisfactory.

5.9 – Tests of Variance of PFL Scores Across Condition Evaluations

This section addresses some of the research questions posed in chapter one of the study and uses MANOVA to determine if statistically significant differences exist among PFL scores and the importance and satisfaction with conditions hypothesized to relate to unconfined wilderness experiences.

MANOVA was used with PFL mean scores (calculated as the sum of ratings for the all item statements, divided by the number of items in the scale) (Ellis and Witt, 1985) serving as

the independent variable with the importance items used as dependent variables. The MANOVA and Wilk's Lambda (F = 1.028 df (676, 1871.988), p = .326) show no statically significant mean vector difference across PFL mean scores and importance of conditions. This suggests that irrespective of PFL score the importance ratings for conditions were not significantly different. That is, despite having a higher or lower PFL score, importance ratings for conditions were similar. This suggests that an individual's leisure functioning did not significantly affect what was perceived as important for the opportunity to have an unconfined experience.

Table 5.45: MANOVA Results of PFL Mean Scores Across Importance of Conditions Evaluations

		Value	F	Hypothesis df	Error df	Sig.
PFL Mean	Pillai's Trace	3.311	1.025	676	2028.00	.341
	Wilks' Lambda	**.019**	**1.028**	**676**	**1871.988**	**.326**
	Hotelling's Trace	4.90	1.030	676	1848.00	.315
	Roy's Largest Root	.900	2.699	52	156	.000

b Exact statistic

c the statistic is an upper bound on F that yields a lower bound on the significance level.

MANOVA was also used with PFL mean scores as the independent variable with the satisfaction items used as dependent variables. The MANOVA and Wilk's Lambda (F = .002, df (572, 863.343), p = .390) show no statistically significant mean vector difference across PFL mean scores and satisfaction ratings of conditions. We again come to the conclusion that despite differences in PFL scores among respondent's satisfaction ratings were not significantly different among different respondent PFL scores.

Table 5.46: MANOVA Results of PFL Mean Scores Across Satisfaction of Conditions Evaluations

		Value	F	Hypothesis df	Error df	Sig.
PFL Mean	Pillai's Trace	4.781	1.018	572	1001.00	.403
	Wilks' Lambda	**.002**	**1.021**	**572**	**863.343**	**.390**
	Hotelling's Trace	9.256	1.022	572	821.00	.387
	Roy's Largest Root	1.874	3.280	44	77	.000

b Exact statistic

c the statistic is an upper bound on F that yields a lower bound on the significance level.

The mean PFL scores for the clusters based on the unconfined wilderness experience scale are displayed in below in table 5.47

Table 5.47: Mean PFL Scores Across Unconfined Wilderness Experience Scale Clusters

Cluster	Mean PFL Score	N	Std. Deviation
"Off to the Woods"	4.2561	142	.41157
"Stick to the Trail"	3.9447	64	.49899
"Happy Warriors"	3.8927	37	.39601
Total	4.1188	243	.46232

The implications of these statistical tests will be discussed further in the subsequent chapter when addressing research questions that were presented in chapter one.

5.10 – Summary

In this section the study hypothesis that were established in chapter 3 will be discussed based on the results and the data analysis.

H_1: Unconfined cluster groupings will differ on mean PFL scores

Inconclusive: Although the mean PFL scores differed between cluster groupings, the MANOVA used to assess whether the difference was statistically significant did not meet all assumptions when conducting further inference based on the test result. This may be due to the smaller size of the sample and non-normality of the data recorded. Although differences were recorded it cannot with certainty be said that they are statistically significant. It should be noted that this hypothesis may be approached using a different method. Instead of conducting a MANOVA with all PFL items included as dependent variables, an ANOVA was also conducted using the PFL mean score as the dependent variable, with the PCA cluster groupings as the independent variable. The equality of variance assumption was met with this method and the Hochberg GT2 (used because of the inequality of cluster sizes) test statistic showed significant differences between cluster 1

and the other clusters, with the only non-significant result coming from the comparison of cluster 2 and cluster 3.

H_2: Component scores will differ by length of stay of visitors

Reject: Among all the mean component scores there was not a statistically significant difference with length of stay of respondents. That is, for each of the four components no ANOVA conducted resulted in statistically significant differences between day visitors and overnight visitors. Day visitors showed similar component scores to overnight visitors on all four components.

H_3: Component scores will differ among sex of visitors

Fail to reject: When looking at sex of visitors there was significant differences for the "Untethered From Responsibility" component and "Exploring" component. Males showed higher mean component scores than females on the "Exploring" component suggesting "exploring" is a more important component to an unconfined experience for males. Females had higher mean component scores for the "Untethered From Responsibility" component suggesting that "untethering" is a more important component to an unconfined experience for females.

H_4: Component scores will differ among age range categories

Fail to reject: Again, we see that component scores differed among ranges for only a few on the components. The "Free Choice" component saw statistically significant differences between 18-24 year olds and 45-54 year olds. The "Untethered From Responsibility" component saw statistically significant differences in component scores between 18-24 year olds and 55-64 year olds.

H_5: Component scores will differ among mode of travel

Fail to reject: Component scores only resulted in a statistically significant difference among the different modes of travel of the respondents for the "Exploring" component. Stock users have the highest mean component score and place the most importance on this component to an unconfined experience.

H_6: Component scores will differ across wilderness experience levels

Reject: Across all four components, the mean component scores did not differ significantly between wilderness experience levels. It was found that cluster four which contained the lowest experienced visitors consistently showed the highest component scores.

H_7: Ratings of Importance for conditions related to unconfined will differ across unconfined cluster groups

Inconclusive: Due to the unmet statistical assumptions of equality of covariance matrices when testing for differences between the unconfined cluster groupings and ratings of importance for conditions related to unconfined experience it cannot be concluded that statistically significant differences existed among the clusters. Again, this may be a result of too small a sample size as with the other multivariate tests conducted.

H_8: Ratings of Satisfaction for conditions experienced related to unconfined will differ across unconfined cluster groups

Reject: When testing this hypothesis, the assumptions of the test procedure were met, however the result of the MANOVA showed a non-statistically significant difference between cluster groupings and their ratings of satisfaction toward conditions related to unconfined wilderness experiences.

Summary

To summarize this section, principal components analysis was used to analyze the 20-item unconfined wilderness experience scale, with 4 components being retained. The four components were dimensionalized as: “Free Choice”, “Untethering From Responsibility”, “Making Own Plans”, and “Exploring”. All components had acceptable reliability statistics, with most components having good inter-item correlations. Component scores were used in K-means cluster analysis to group respondents into three clusters named, “Off to the Woods”, “Stick to the Trail”, and “Happy Warriors” to help differentiate them and illuminate if certain dimensions were more or less important across clusters. Analysis of variance tests between the clusters and trip and visitor characteristic variables largely revealed no significant differences based on length of trip, sex, age, and mode of travel. This suggests that what is important to feeling unconfined is largely independent of these variables. Respondents have well-defined notions about what is important to feeling unconfined, yet these notions aren’t predicted by things such as trip length, sex, age, and mode of travel.

The next chapter of the study will address the research questions that helped to guide this study, followed by a more interpretive discussion of each of the four components of unconfined wilderness experiences. Within this interpretation and discussion management implications of the findings will be addressed as well as suggestions for future research on unconfined wilderness experiences. The final section will cover the limitations of the study, attempting to illuminate how they may have impacted the results and what may have been differently to improve upon the research. Following discussion of the limitations a summary and conclusion will be presented.

Chapter 6 Discussion

The principal goal of this study was to expand our knowledge about unconfined wilderness experiences. There has been little, if any research to date that has focused solely on this three word phrase in the Wilderness Act, "unconfined type of recreation" (PL 88-577). Chapter one of this study focused on this relative lack of knowledge and presented a conceptual definition of unconfined type of recreation. Chapter one also introduced the research purpose of developing a scale for measuring the importance of unconfined wilderness experiences and the setting attributes that may be important to feeling unconfined. Chapter two attempted to frame the context of this study and to identify gaps in the wilderness experience research as it pertains to unconfined type of recreation experiences and setting attributes. Chapter three presented the methods used in the study and described in detail the Selway Bitterroot Wilderness area, sampling plan and data analysis. Chapter four presented the results of the data and functioned to describe the characteristics of the sample population. Chapter five examined the 20-item unconfined wilderness experience scale through principal components analysis, with a four component solution being retained. The four components were: Free Choice, Untethered from Responsibility, Making Own Plans, and Exploring. These are suggested as dimensions (components) of what is thought to be an unconfined wilderness experience.

This chapter will be divided into three sub-sections, the first section will address the research questions that were used to guide this study. The second will address each of the components and management implications of the research. The third will discuss future research opportunities and the limitations of this study.

6.1 – Research Questions

Research Question 1: What setting attributes influence the opportunity to have unconfined type of recreation experiences?

In hindsight, this research question is somewhat poorly worded. It is a question that is hard to answer, and it is this researcher's opinion that the question can't be fully answered based on the results. A better question now may be what setting attributes do respondents rate as most important for opportunities to have unconfined wilderness experiences? What the data does suggest is that for the setting attributes included in the survey, all have the potential to influence the opportunity for unconfined type of recreation experiences. Because every item statement asking about the importance of conditions to the opportunity to have an unconfined wilderness experience received responses that spanned the full range from (not at all important) to (extremely important), it can be concluded that all of the conditions have the potential to influence the opportunity for unconfined wilderness experiences. This may be a significant finding. That is, some visitors see the conditions as important while others don't. The results are not uniform but salient and differentiating because the specific setting attribute or condition statements represented managerial, environmental, and social setting attributes, all three categories of setting attributes have the possibility to influence the opportunity to have unconfined wilderness experiences. Thus, it is clear that it is not just managerial conditions influencing unconfined wilderness experiences. The unconfined wilderness experience is more nuanced than previously thought and is influenced by numerous other conditions experienced in wilderness. What can't be fully answered is how they influence these opportunities: Do they enhance or detract from a visitor's opportunity to achieve an unconfined experience? It is possible that future studies continuing the exploration of unconfined wilderness experiences

could be comparative or quasi-experimental. For example, wilderness areas with polar sets of setting attributes i.e. permit versus no permit, might be compared to see if visitors feel more unconfined in one or the other. Many setting attributes can be used in a comparative study and questions could also be asked surrounding which conditions had the most influence of achieving an unconfined wilderness experience.

It is most likely that level of unconfined-ness is more accurately thought of as existing on a continuum and that some experiences are more unconfined than others, yet all experiences in wilderness would have some dimensions of being unconfined. The presence or absence of the setting attributes included in this study does not guarantee or completely prohibit a visitor from feeling unconfined. While managers control and manipulate the setting attributes present in our wilderness system there is no guarantee that a visitor is going to feel completely unconfined during their visit.

Research Question 2: What setting attributes are most important to the opportunity to have an unconfined wilderness experience?

This research question again has some slight problems and may have been more carefully worded as what setting attributes do respondents rate as most important for opportunities to have unconfined wilderness experiences? Based on mean evaluations of importance, the most important setting attribute to the opportunity to have an unconfined wilderness experience was having campsite choices that are out of sight and sound of others. The second most important setting attribute was not having other groups camping within sight and sound of your camp. These setting attributes are very closely tied to the concept of solitude and feeling like your group has privacy from other visitor groups. An interesting question to consider when reviewing these results is, are social interactions in wilderness confining? Is the escape from complex social

interactions that we experience while in wilderness a feature of what makes the experience feel unconfined? These setting attributes are social setting attributes and suggest that the social setting (or lack thereof) may be more important than other setting attributes for opportunities to have unconfined wilderness experiences. The implication for managers surrounding this question may again be tied to previous research (or lack thereof) on unconfined wilderness experiences. It is not just managerial conditions which affect the unconfined experience and it would behoove managers to realize there are other conditions which influence unconfined type recreation. Managers should encourage further research on unconfined experiences and place a higher level of importance on this dimension of the wilderness experience. We need more studies to tease out what makes the experience unconfined, or what is it about the character of wilderness that allows people to achieve unconfined type recreation.

When looking at the next two most important conditions based on mean scores, we see setting attributes that are managerial setting attributes: no permit is required, and not having restrictions placed on where you can travel. This suggests that managerial conditions can influence a visitor's experience of feeling unconfined and that regulations can play a role in degrading an unconfined experience. This is a somewhat important finding as it gives credence to management frameworks such as wilderness character monitoring where it is assumed that number of regulations are threats to an unconfined experience (Landres et al., 2015). Further, managers should try not to over manage wilderness in attempts to control the experience and managers must be careful when considering what regulations are absolutely necessary to protect the wilderness resource and when such regulations should be enforced. What these findings also suggest is that we should not base unconfined wilderness character solely on managerial conditions. This study has data that suggests that there may be other types of conditions such as

social conditions that are both important to feeling unconfined, and that have the potential to be monitored through the use and further development of indicators. The WCM framework could quite easily include or expand the indicators used to monitor the "solitude or a primitive and unconfined type of recreation" quality of wilderness character. If indicators related to social setting attributes are established to be important to unconfined wilderness experiences and were included, monitoring wilderness character would improve it's accuracy in monitoring the character of wilderness for this quality.

Research Question 3: Are the indicators chosen valid measures of outstanding opportunities for unconfined type of recreation experiences?

It does seem that at least some of the indicators chosen are valid measures for what is important for feeling unconfined while in wilderness areas. Validity, in this use of the word is taken to mean well-grounded or justifiable, being at once relevant and meaningful. If the indicators did not relate to unconfined in any way, we would expect to see extremely low ratings of importance for those indicators. The lowest mean score of 1.76 belonged to the indicator of 'having trails that are completely primitive' with no maintenance or trail structures such as bridges. Although this indicator (which is an environmental setting attribute) has a very low mean score it still received ratings of importance spanning the full range of the rating scale. We can assume that to some respondents primitive trails are important to feeling unconfined, just not to the majority of respondents. Although it cannot be said definitively that these are the best, most relevant indicators of unconfined type of recreation experiences they do resonate with the respondents from this study. Future research could focus on other indicators, especially those belonging to the social and managerial setting attributes that may be relevant to a visitor's perceptions of what is important to feeling unconfined while in wilderness. A point important to

consider surrounds future research opportunities. As will be discussed later, a qualitative approach exploring unconfined wilderness experiences may be used to develop other indicators not used in this study and not previously identified. As in Watson et al. (2007), the respondent has the potential to help researchers identify indicators that are relevant to the concept being studied, in this case unconfined experiences. The relevance of items and indicators would be established by the respondents, through emergent themes.

Research Question 4: Does variation in PFL scores influence the importance ratings of particular setting attributes?

It may but respondent's perceived freedom in leisure scores showed no significant difference when rating conditions of importance for particular setting attributes. The ANOVA tests resulted in no statistically significant difference between PFL scores and importance ratings suggesting that PFL scores are not strongly associated with the conditions perceived to be important for unconfined wilderness experiences. This tells us that even those with higher PFL scores (who demonstrate more perceived freedom) rated the indicators in this study very similarly to those who demonstrated lower perceived freedom in leisure. As with other visitor characteristic variables measured, such as length of stay or mode of travel, the respondent's perception of what is important to feeling unconfined did not depend on leisure functioning. Leisure functioning is dependent on a persons perceived freedom in leisure. That is, a high PFL score would indicate that the person has a high degree of perceived freedom in their leisure and that this person's leisure can be expected to be rewarding and fulfilling (Witt & Ellis, 1987). A visitor with comparatively low leisure functioning rated conditions important to feeling unconfined similarly to those with high leisure functioning. This was a theme that appeared throughout the data analysis. Ratings of what was important to feeling unconfined were largely

independent of visitor characteristics including a respondent's perceived freedom in leisure. A possible reason for this trend may be that respondents have a fairly stable definition of unconfined that consists outside or independent of other variables. This may be taken that PFL scores are uncorrelated with a wilderness visitor's perceptions of unconfined experiences.

Research Question 5: Does age, mode of travel, or previous wilderness experience determine visitor preferences for conditions as they relate to unconfined wilderness experiences?

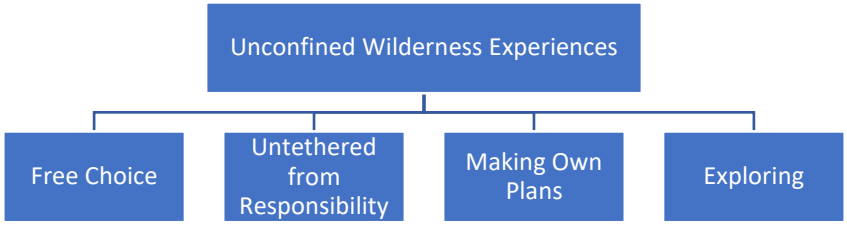
Most likely not. Across each of the components of unconfined, age, mode of travel, and previous wilderness experience did not seem to play a role in predicting differences among visitor preferences for conditions thought to be related to unconfined experiences. An interesting finding is that the cluster containing those respondents that had the least previous wilderness experience reported the highest ratings on all four components. This suggests that these visitors may have a degree of anticipation and motivation towards those conditions, more so than visitors who have previously visited the SBW or other wilderness areas. This also suggests that despite the lack of experience, the respondents still have a well-defined idea about what is important to feeling unconfined while in wilderness. The implications of this finding are that as we see visitation rates increase to public lands and wilderness areas, we are likely to see a higher number of visitors who have less experience. This less experienced group may be the most important group to provide outstanding opportunities to have unconfined experiences since they had the highest ratings on the importance of components of feeling unconfined.

Research Question 6: Is the conceptual model presented in chapter 2 an accurate description of the relationships between PFL scores, visitor and trip characteristics, setting attributes, and the importance and performance of setting attributes?

It would appear that the model presented in chapter one is not necessarily a complete representation of the relationships between respondent PFL score, visitor and trip characteristics, setting attributes, and the performance and importance of setting attributes to feeling unconfined while in wilderness. If the model were to hold true, we would have expected to see some statistically significant differences among the independent variables (PFL, visitor and trip characteristics) based on the dependent variables (importance and performance evaluations of setting attributes). Since the data collected didn't meet certain assumptions required for inference of the MANOVA test statistic it cannot be said that the model is a true representation of the relationships of these variables.

The model presented needs further development and research to more accurately represent what the relationships are between visitor and trip characteristics and the importance and performance of setting attributes thought to relate to unconfined wilderness experiences. It must be taken into consideration however, that the model presented in chapter two was not evaluated using structural equation modeling (SEM) to test the model's fitness and so it is inappropriate to speculate on model validity. A model based on the components extracted of unconfined wilderness experiences is presented in figure 6.1. However, it is hard to compare the two models without having performed structural equation modeling on either model. Upon further examination it may be true that the model presented subsequently would result in a better fit than that of the model presented in chapter two, however no definitive conclusion can be made without performing that type of analysis on the two models.

Figure 6.1: Model of Unconfined Wilderness Experience



6.2 – Component of Unconfined Wilderness Experiences

In this section each of the four principal components that were extracted during the factor analysis will be discussed. This section will provide an interpretation of the findings, and some of the possible management implications based on the findings. The implications presented are meant to clarify our understanding of unconfined type of recreation experiences and address some of the unknowns regarding each component.

Implications of Free Choice

The "Free Choice" component of unconfined wilderness experiences suggests that conditions thought to relate to freedom of choice are important for wilderness visitors to feeling unconfined. The item statements in the "Free Choice" component aren't narrowed to specific action-related choices only. They can be thought of in broader, more general terms. For example, the item statement "you feel like you make your own way" is a broad statement which encompasses many choices throughout the duration of the trip. Similarly, "you feel like you are in wide open spaces" isn't about a specific choice that must be made, but more of a psychological state of unconfinement in which the visitor is free to make any choice. Feeling like there are no rules to follow decidedly lets the visitor make free choices about how to behave in the wilderness and loaded strongly within the free choice component. The statement "you feel like you just pack some things and go" suggests that there is a spontaneity to free choice that is important to feeling unconfined while in wilderness. Feeling like "you can camp anywhere"

correlated highly with feeling like there are no rules and suggests that being able to choose camping location is important to feeling unconfined. It is not unsurprising that this ended up being a component. Freedom, spontaneity, and lack of rules seem to be fairly fundamental to feeling unconfined. It seems that "Free Choice" is indeed vital to achieving what Zahniser considered to be a true wilderness experience.

Management Implications of Free Choice

The management implications of the "Free Choice" component do suggest that managers should minimize control of the visitor's trip to a wilderness area in order to maximize the unconfined-ness of the experience. Managerial control often starts even before the visitor reaches the wilderness area from requiring pre-registration for entry permits such as is the case in some busier wilderness areas such as the Boundary Waters Canoe Area Wilderness. A visitor who has to register for a permit that only allows them to enter the wilderness at a specified location is quite unable to just pack some things and go, or to truly make their own way. They are confined to a pre-determined date of entry and confined to a pre-determined location for where they must start and end their trip. However necessary permitting regulations and policies such as this may be, they still can threaten the unconfined wilderness experience. Since the SBW doesn't require permits for entry and this was a point of satisfaction for this study's sample population it would be interesting to test this in a wilderness area which does have a permit system. Often the justification for rules and constraints of freedom of movement comes from protecting the opportunity to experience solitude. This suggests that these approaches for preserving solitude may come with a cost to preserving unconfined experiences. Interesting to contemplate is the idea that solitude and unconfined are at odds with each other (with respect to how managers attempt to provide opportunities for these dimensions of the wilderness experience). What may

be even more interesting is do they have to be? Are there ways that managers can preserve opportunities for both? This is ultimately the goal of the wilderness manager. To provide outstanding opportunities for both solitude *and* a primitive and unconfined type recreation. It is realized that this is a deviation from the wording of the Wilderness Act which uses "or", yet this researcher does not take this phrase to mean that managers have the option of providing one or the other. We must strive to provide both, and ideally at the same time, within the same experience. Alternatively, visitors may be provided the choice to decide if one or the other or both are most important to them.

One thing to consider with the items that made up the "Free Choice" component is the mean importance ratings of the items. Four of the five items were rated in the bottom six item statements when looking at the mean values from the 20-item unconfined scale. This may suggest that these items are less important to respondents than other items for achieving an unconfined experience. Yet no study and survey are without its flaws, and strength of wording impacts relative importance. It may be that statement wording affected respondent evaluations But most of these items could be directly or indirectly related to managerial setting attributes, such as requiring a permit or not, and again have evidence to suggest that managerial setting attributes may not play as large a role in influencing unconfined wilderness experiences as other setting attributes such as social conditions. One of the main measures of threats to unconfined experiences in the WCM framework (Landers et al, 2015) is how many and what type of regulations are placed on the visitor. Using managerial setting attributes as measures of unconfined character may not be the most appropriate indicators for managers to use when monitoring the unconfined character of a wilderness area. As mentioned, the WCM framework

may improve if other indicators of different and varied setting attributes were included in monitoring this quality of wilderness character.

Implications of Untethered from Responsibility

The "Untethered from Responsibility" component of unconfined wilderness experience contained the items: "you are untethered from email", "you are untethered from your phone", "you are free from work responsibilities", "you are enjoying what you are doing so much you lose track of time", and "you feel like you could keep going". This component can be addressed from two viewpoints. One viewpoint is that a general untethering from the responsibilities of work and daily life is needed to feel unconfined. These have been established motivations for wilderness visitation for decades (Manfredo, Driver, & Tarrant, 1996). This study connects these specifically to feeling unconfined, which is quite novel. Another viewpoint is that a lack of digital connectivity to email and phones are important conditions for feeling unconfined. The establishment of this component provides further support that being away from modern technology and a digitally connected self is an important aspect of the modern wilderness experience (Lang, 2018). The responsibilities of daily and work life could be seen as confining for the individual and by spending time in wilderness areas individuals are granted a temporary reprieve from this confinement. It would seem that the character of wilderness and the conditions experienced while in wilderness are in themselves unconfining due to the lack of availability to be digitally connected. The "Untethered From Responsibility" component also suggests that there is an inter-rhythm with nature that both happens when visiting wilderness but is also important to feeling unconfined. When visitors disconnect from their usual daily responsibilities of work and daily life via disconnecting from phone and e-mail communications the visitor is connecting with nature instead. This connection with the natural world and the wilderness

environment and lack of connection to other responsibilities may be part of what makes the wilderness experience unconfined.

Management Implications of Untethered from Responsibility

The most obvious management implication based on the "Untethered From Responsibility" component is that surrounding the primeval character of wilderness areas. If wilderness areas are to provide outstanding opportunities for an unconfined type of recreation and a major component of feeling unconfined is being away from digital devices and work responsibilities (a primeval environment), then the infrastructure that keeps us connected needs to be kept out of wilderness areas. The findings of this study suggest that visitors value the opportunity to be away from internet connections that keep us connected to work responsibilities and would threaten the unconfined nature of the wilderness experience. Section 2(c) of the wilderness act specifically defines wilderness as "undeveloped federal land retaining it's primeval character and influence, without permanent improvements…and which generally appears to have been affected primarily by the forces of nature with the imprint of man's work substantially unnoticeable" (PL 88-577). Even if not located in wilderness, a tower which provides cellular service and internet connection into the wilderness is unquestionably an imprint of man's work and would threaten unconfined experiences. One very interesting thing to consider from a management point of view is that if untethering from responsibility may help achieve unconfined experiences should managers encourage visitor immersion? This study noted that wilderness trips in the SBW are generally getting shorter, which may limit the visitor's ability to truly or fully untether from daily responsibilities. Managers could incentivize longer trips, in turn encouraging a more thorough untethering from responsibility. Especially relevant in

wilderness areas that require the purchase of permits for entry, managers could use a sliding fee scale where permits for longer trips cost the visitor less.

Implications of Making Own Plans

The "Making Own Plans" component included the items 'making your own plans' and 'making your own schedule', 'being able to change your plans, and 'being able to go at your own pace'. The implications of this component seem fairly obvious, trip planning is part of the experience and it is a part of the experience that is necessary for feeling unconfined and needs to be controlled by the visitor. The wilderness experience starts before the visitor ever steps foot in the wilderness. There is anticipation and excitement when planning a wilderness trip that is directly related to making your own plans. Feeling like you get to choose where to go and when to go is an important element of feeling unconfined. "Making Own Plans" is subtly different from "Free Choice" because when the visitor makes their own plans, they are mentally designing their trip and establishing expectations about what their trip may be like. The "Free Choice" component is broader and more general whereas "Making Own Plans" concerns specific choices about designing the trip. When the visitor makes their own plans, they still need to have freedom to design their trip the way they want but the freedom in this component is related to specific decisions about where to go and when. Knowing that you can change your plans provides freedom to the visitor and removes the constraints associated with a rigid itinerary or schedule.

Although the components as a whole were uncorrelated with each other (as explored with oblique rotation during the principal components analysis) they do interact in some ways with each other which paints a fuller picture of what is important to feeling unconfined. That is, for example, making your own schedule and plans interacts with the freedom of choice that lets the visitor experience their trip on their own terms in an unconfined way. Being able to change your

plans and go at your own pace untethers the visitor from other types of responsibility, such as responsibility to time and schedules. Going at your own pace is both physical and psychological, the visitor is not only going at a pace comfortable to them physically but also slower than we move in the modern world full of mechanical transport. This movement at the pace of the natural world is important and makes the experience seem less confined. In sum, the components interact with each other in complementary ways that when combined give a clearer picture of what is important to feeling unconfined while in wilderness.

Management Implications of Making Own Plans

The management implications of "Making Own Plans" most directly relate to itineraries and permitting processes. If at all possible, rigid schedules of when to camp and where should not be assigned nor required by managers. For example, on some wilderness river trips such as the Middle Fork of the Salmon River through the Frank Church Wilderness specific camping sites must be reserved for every night while on the river. While this is designed to ensure boaters get the camp they want, it decidedly takes away from the visitor's ability to change their plans. It does not allow the visitor to change camping spots if they see a more desirable site and does not allow the visitor to boat more or less miles than planned. As these practices may be in place to preserve solitude through limiting encounters, they come at a price of degrading the unconfined aspects of the wilderness trip. Again, we see that because of management policy solitude might be pitted against unconfined with preservation of solitude trumping unconfined. Also, pre-planned camping itineraries, such as in the Daniel J Evans wilderness and other surrounding wilderness areas in Olympic National Forest and National Park, are required for quota areas and decidedly have the possibility of degrading the unconfined wilderness experience (quota areas are areas that see high use and have particularly desirable or unique destinations). Managers

must balance between resource protection and experience protection as sometimes the two may be at odds with each other.

Implications of Exploring

The "Exploring" component of unconfined wilderness experiences suggest that feeling like you are exploring and going somewhere new, feeling like you can explore off trail, feeling like you are roaming and have the skills to do so are significant to feeling unconfined. The establishment of this component provides support for other past research on cognitive dimensions of the wilderness experience (Dawson, Newman, & Watson, 1998) but connects it more specifically to feeling unconfined. This component may also suggest that visitors still associate wilderness experiences with the establishment of American individualism and pioneering. We still value places that allow us to feel like we are explorers of old, forging west into new territory. It can also be noted that even though a visitor may have been to many other wilderness areas, or even the study area, many times this still emerged as important to feeling unconfined. An interesting question for further research on unconfined wilderness experiences may be how does a visitor feel like they are exploring when they have visited an area previously?

Management Implications of Exploring

One management implication that arises from the establishment of this component is that visitors should be encouraged to explore and travel cross country away from trail systems. Managers often have regulations that encourage the visitor to only use marked maintained trails. Social trails have always been discouraged and seen as a resource problem. While this may be valid in riparian areas of high sensitivity, we also need to consider how this sets up a norm that could be interpreted as anti-exploring. It is often necessary when considering public safety to recommend that visitors stay on trail and come prepared with topographical knowledge of the

area they plan to visit, but it may also be argued that this degrades the spontaneous nature that is so valuable in true exploration. We may also consider whether maps should be provided or are desired by visitors. Again, when considering public safety, no manager wants a high percentage of visitors getting lost in the wilderness, so it may be important to consider how managers can encourage exploration without endangering visitors. One solution may be related to educational programs. Both the National Park Service and US Forest Service engage the visitor with interpretive programs and ranger programs. Could resources be devoted to certification programs where the visitor is trained and tested on navigation and cross-country travel in effect encouraging exploration? The paradox of risk management is that the more managers check and prescribe, the more they shoulder the liability. No manager wants more liability for visitor safety, and, indeed, it should not be put on managers to ensure visitor competence, yet exploration should be encouraged. Managers should also critique their sign placement in wilderness. Installation of directional signs at trail intersections is common practice, even in wilderness areas, and yet, this does nothing to protect visitor safety. The installation of directional signs is purely for visitor comfort and convenience and should be limited, as this practice may degrade the unconfined experience. As with other components of unconfined there are elements of feeling unconfined that need to be balanced with other aspects of the experience, safety being one especially relevant to this component. What this component does suggest is that exploring new places and roaming are important aspects to feeling unconfined.

General Implications of Unconfined Scale

Broader implications of the data analysis on the 20-item unconfined wilderness experience scale suggests that both the component scores and the cluster analysis based on component scores showed no clear visitor or trip characteristics that were significantly correlated

on the scores or clusters. Said another way, whether the visitor was making a day trip or an overnight trip, whether they were a backpacker or stock user, whether they were male or female, young or old, each group varied on component scores and cluster membership. What this suggests is that when managers attempt to provide outstanding opportunities for unconfined type of recreation experiences, they should not expect that they can manage for a certain visitor type or demographic and achieve unconfined experiences. Unconfined experiences hold meaning, and respondents have clear ideas about what is important to feeling unconfined, yet these do not seem to be dependent upon trip length or the other variables measured in this study. Conversely, the manager should not expect that managing for unconfined has benefits for any particular visitor type or characteristic.

Managers also need to ask if the way that visitors think about unconfined experiences is the same as the way managers think about unconfined experiences. As in the WCM framework, unconfined is frequently lumped together with solitude and primitive recreation. But, when we monitor wilderness character this way, we may not be using the best strategy to determine what wilderness character is, or in line with what the visitor thinks about wilderness character. However, there is still ample opportunity to discuss this idea. It may be that solitude and unconfined are highly related to each other in which case it may be valid to continue monitoring wilderness character according to the current framework.

Implications of Importance and Satisfaction Ratings of Setting Attributes

When looking at the importance and satisfaction analysis only one setting attribute indicator landed firmly in the ‘concentrate here’ quadrant. This item had high importance to feeling unconfined but was rated with low satisfaction by study respondents. The item was ‘not having other groups pass within sight and sound of your camp’. This was considered a social

setting attribute and again suggests that the social conditions experienced in wilderness can influence a visitors feeling of unconfined recreation. It may be that many campsites in the SBW are located near the trail or located close to other campsites which may cause overnight campers to see other parties more readily. As far as the management implications go for this item it is difficult if any recommendations can be made as camping is not required in designated sites in the SBW. Moreover, this indicator has been shown to be important to feeling unconfined and this policy (not requiring camping in designated sites) should continue. Campers are free to choose where to camp and if they choose a camp that is more likely to be passed by other visitor's, managers have little control over this. If, however in the future managers were to see the need to required camping at designated sites then the sites established should be away from trails and preferably out of sight and sound of other designated camping sites.

Another interesting finding based on the importance and satisfaction with setting attributes is when we consider what items landed in the low priority quadrant. These items had low importance scores and low satisfaction scores. The items included in this quadrant were all related to managerial conditions and were "having trails that are completely primitive", "seeing and not seeing mileage signs", and "seeing signs stating regulations about the wilderness area". What this suggests is that some visitors want maintained trails and don't feel that sticking to a well maintained trail degrades the unconfined wilderness experience. Even those who have high previous wilderness experience, those who may have purist wilderness values, still appreciate maintained trails. It may be that those with high experience or with purist values want to get into the wilderness as far as possible and maintained trails allow them to achieve this goal. They want immersion in the wilderness which may partly be a function of how deep one can travel into the wilderness.

Also, seeing mileage signs or not seeing mileage signs was of low importance to respondents. Again, signs should be kept to a minimum in wilderness areas as they are a form of permanent improvement by humans and this can be a condition maintained by managers. It is this researcher's opinion that there should be more stringent standards for placing signs in wilderness. Signs need to be reserved only for very real safety issues or where marked resource damage is occurring. This is the only legal justification for signs in wilderness as stated by the Wilderness Act "except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be no… structure or installation within any such area" (PL 88-577). What the importance and performance measures clearly suggest is that managerial setting attributes may be of lower importance for the opportunity to have unconfined wilderness experiences.

Implications of PFL Scale

The implications of the PFL scale most notably surround the MANOVA analysis with the importance and satisfaction ratings of conditions of setting attributes. As mentioned in chapter 5 there were no statistically significant differences in PFL scores and importance of setting attributes and satisfaction with setting attributes. This suggests that despite different levels of leisure functioning (as measured by the PFL scale) ratings were similar among this study's respondents for conditions important to feeling unconfined. It may be that respondents in this study generally had high levels of leisure functioning and this study didn't capture those that may fall at the lower end of the spectrum of this scale, (this is one possible explanation for the non-significant MANOVA results). Another explanation is that leisure functioning as measured by the PFL scale is uncorrelated with what is important to feeling unconfined. When looking at

the distribution of mean PFL scores we saw a range from 1.8 to 5 with the mean at 4.12. To this researcher's knowledge there are no national averages for this scale, and as such, this study doesn't have a representative study to be compared to. Yet, this is obviously on the high end, denoting a highly functioning sample population. Only .4% of this sample population fell below the mid-point cutoff of 2.5. Further 60.5% of this study's sample mean scores fell above 4.0 again suggesting a highly functioning sample population.

6.3 - Future Research

Future research resulting from the findings of this study are multiple and varied. The first, and most important, concerns the validity of the unconfined wilderness experience scale that was established by this study. Future research could further validate this scale through replication and administration to larger and more diverse audiences. This scale could be tested throughout other wilderness areas and re-subjected to confirmatory factor analysis to see if items load as the same components. This study sought to establish a first attempt at measuring unconfined wilderness experiences through this scale development. Many factor solutions were explored, based on the best available statistical recommendations, using both orthogonal and oblique rotation methods, and other extraction methods than principal components. The scale that emerged remained largely unchanged throughout that process. Combined with the internal reliability statistics (such as the Cronbach's Alpha), this suggests that it is initially a stable and valid scale that should be replicable. This author encourages other future researchers to re-test this scale as it would continue to increase our knowledge of unconfined wilderness experiences.

Other future research can extend the conclusions drawn about social setting attributes being the most important to feeling unconfined for this study's participants. The indicators that were included as social setting attributes were closely related to long term encounters (such as

being camped next to others) and have traditionally been associated with solitude research. Asking what the relationship is between feeling unconfined and achieving solitude may be beneficial to further understanding the modern wilderness experience. As has been discussed, it seems that there are management practices and policies which attempt to preserve solitude but have the potential to degrade unconfined experiences. The question becomes, how can managers provide opportunities for both at the same time? It may be that certain ways of managing for solitude can also yield unconfined, if the two are related and complimentary. Extending this line of thinking raises the question can and do visitors feel unconfined in non-wilderness areas? Or are the conditions found in wilderness necessary or more conducive to feeling unconfined? As with a potential comparative study with other wilderness areas that have dichotomous setting attributes, wilderness and non-wilderness may be compared to answer this question.

This study has developed these dimensions of unconfined yet never asked if these dimensions were being met. This study established that going at your own pace is important to feeling unconfined yet never asked were you able to go at your pace. Was there something that prevented you from doing so and what was that? Future research could address if visitors actually achieved experiencing items found in the 20-item unconfined experience scale.

When designing this study, the possibility of a qualitative approach was explored and also has the potential to increase our knowledge of unconfined wilderness experiences. Developing a qualitative understanding of the elements that make up the unconfined wilderness experience scale would provide deeper and complimentary insights into what is important to feeling unconfined while in the wilderness. A qualitative study could also explore how much setting attributes affect the experience and whether unconfined experiences can be achieved across a range of setting attributes. A qualitative study also has the potential to answer the ‘why’

surrounding items established in this study to be important to unconfined experiences. For example, why is not having groups pass within sight and sound of your camp more important to feeling unconfined than seeing mileage signs. What is it about this indicator that affects the unconfined experience more than other indicators chosen in this study? A qualitative study of unconfined wilderness experience also has the possibility of exploring how unconfined experiences relate to experiencing solitude in wilderness areas. Questions such as:

- Do you feel confined when in close proximity to others in the wilderness?
- Does a wilderness trip where you see little to no other groups feel more unconfined than a trip where you see a lot of groups?

Answers to these questions may further our understanding of how these important concepts relate to each other and may help managers interpret the "opportunities for solitude or a primitive and unconfined type recreation" phrase found in the Wilderness Act.

6.4 - Limitations

There were a number of limitations encountered throughout the course of this study that may have influenced the results. The first limitation relates to sample size and sampling methodology. Although the sample size achieved was respectable and met the lower end of desired minimum sample size, it is just that, the minimum. With larger sample sizes inevitably comes more variation and more normal distribution of responses. The statistical analysis performed on this sample would, without doubt, have benefited from a larger sample. This was mostly due to limited sampling resources and a very wet, cold start to the summer of 2018 which saw very little use of the SBW in the month of June.

Another limitation surrounding the sample population is that this study used a convenience sample. A representative random sample would have increased the generalizability

of the findings and decreased sampling error. Sampling error is the tendency of a sample to be limited in its ability to accurately describe the entire population, because some, rather than all, of the elements in the population are sampled, in this case all visitors to the SBW (Vaske, 2008). Although a representative sample would have made findings more generalizable this sample still met statistical assumptions for completing the principal components analysis as shown by the KMO and Bartlett's test of sample size adequacy. Despite the statistical assumptions being met for the PCA, it would have been beneficial to be able to describe the population of SBW summer visitors. There are two reasons for this, the first being that a representative sample of summer visitors to SBW has not been obtained since Lucas conducted his study since 1980. Even simple descriptions of visitor and trip characteristics is valuable information to have especially considering trends observed over time. The second is that the 20-item unconfined scale developed would have more credibility if associated with a true representative random sample of the SBW visitor population.

Another limitation of this study concerns the very small amount of stock users contacted as respondents. It was expected that a larger proportion of the sample would consist of stock users and this may have provided a greater variation of responses. Again, this limitation concerns sampling error in that this population may not have been accurately represented in this study. Only replication and greater sampling resources could have mitigated this sampling error.

Further limitations encountered in this study concern statistical analysis. The first issue corresponds to the normality of the distribution of the data, especially for the items contained within the 20-item unconfined scale. The assumption of normality is not required when conducting factor analysis and principal components analysis, but it is an important requirement when conducting ANOVA's and MANOVA's. Fortunately, as the sample size increases the

assumption of normality becomes less important and it was determined when conducting those analyses in this study that the sample size was of sufficient size to conduct inference based on these techniques. Yet a larger sample may have alleviated some of the non-normality found in the distribution of responses for these items. However, for the MANOVA comparing the PCA scores with the Importance scores, the assumption of equality of covariance matrices was not met and inference could not be conducted on these parts of the data.

Non-normality may also be a function of question wording and is commonly found when asking about importance and satisfaction. For example, there is a tendency for responses to gravitate towards the poles of the item scale, and an item that asks 'how important is camping out of sight and sound of others' tends to get ratings consistently at one end or the other of an importance scale. This was considered and was why a 7-point scale was used to try to increase the sensitivity of measurement and mitigate this limitation, yet it remains a limitation of this study.

More limitations concerning statistical analysis surround the model developed in chapter two. As briefly discussed, the model was not formally tested using SEM or path analysis. Therefore, the goodness of fit of the model can't be determined and is a limitation of this study. Furthermore, when conducting the cluster analysis on the principal component scores it was determined that case 147 was an outlier and consistently formed its own cluster. Because of this, case 147 was excluded from the cluster analysis using the principal component scores as the cluster variate. It may be that this respondent was truly aberrant and therefore exclusion is justified, yet it may also be the case that a portion of the sample population was not captured adequately.

6.5 – Recommendations

Embedded in the implications of the components, the importance and performance analysis, and the perceived freedom in leisure scale are conclusions that pertain to mangers of wilderness and management policy. This section seeks to make these more apparent by providing concrete suggestions of how this study can enhance wilderness management pertaining to opportunities for unconfined type of recreation.

Recommendation 1: Consider focusing monitoring efforts on indicators that enhance opportunities for unconfined type of recreation. To date, managers and administrators of wilderness areas have largely focused on threats to opportunities for solitude and a primitive and unconfined type of recreation along with other qualities of wilderness character when implementing and designing monitoring frameworks such as LAC and WCM. Managers determine conditions that threaten these opportunities and try to avoid having those conditions present in the wilderness. An example helps illustrate this, within the WCM framework, "opportunities for solitude are degraded by both visitor use in wilderness and certain characteristics of the setting. Specifically, encountering other visitors in wilderness, or seeing or hearing the signs of modern civilization, may detract from opportunities to experience solitude" (Landres et al., 2015, p. 53). Seeing and hearing other visitors or other signs of modern civilization are threats to solitude and we try to monitor these conditions and minimize them through management action and policy. Yet there is another approach that could be taken.

Instead of focusing on threats, managers may focus on settings or conditions that enhance opportunities for unconfined type of recreation. The difference is subtle and can be difficult to comprehend yet may benefit the visitor experience. Instead of focusing on threats to unconfined type of recreation in the form of management restrictions on behavior, managers may focus on

developing management actions that enhance opportunities for unconfined type of recreation. Again, an example may help illustrate this recommendation. As a result of this science, we now know that exploring is an important component to opportunities for unconfined type of recreation. Exploring includes going somewhere new, exploring away from trails, roaming wherever you want, and having the skills to do so. If managers set up conditions that facilitate this component they enhance opportunities for unconfined type of recreation. This could take the form of offering free navigational programs to visitors to enhance their exploring skills, discounted or free permits to visitors that are from out of state if permits are required, and/or preference for permit allotment to visitors who can prove they haven't held a permit for their desired trip before. If passes are required to park at trailheads, such as with the Northwest Forest Pass in Region 6 within the Forest Service, passes could be discounted or free for visitors who claim residence in different regions. This enhances opportunities for exploration and gives visitors incentives to visit new wilderness areas and to explore. This researcher realizes that crucial funding for programs comes from the sales of these passes, yet enhancing opportunities for exploration and in turn unconfined type of recreation is a mandate of the Wilderness Act.

The same goes for enhancing conditions important to the other components established by this research. Conditions that enhance the making own plans component go beyond not requiring campsite registration and travel itineraries. Wilderness managers could implement programs which provide assistance for the visitor to make their own plans and this could be combined with suggestions for opportunities for exploration. Another hypothetical example is helpful. What if there was an application on the managing agencies website that was provided to help the visitor design their trip? The visitor could navigate an interactive map of the desired wilderness and plan destinations they wanted to visit. The destinations would not need to be

limited to those served by the maintained trail system. The visitor could start on a maintained trail then select a destination served by the maintained trail system. Other nearby desirable destinations could be suggested. These next suggestions could be categorized into off trail destinations or on trail destinations giving the visitor the freedom to both design their trip and explore the wilderness in whatever way they wanted. This gives the visitor freedom of choice to make their own plans and encourages exploring the entirety of the wilderness. This is purely a hypothetical example, yet one that focuses on ways to enhance the opportunity for unconfined type of recreation. We strive to create conditions and give the visitors resources to be unconfined during their visit.

Recommendation 2: Consider developing indicators based on the unconfined wilderness experience scale established by this study. If managers were to focus monitoring efforts on indicators that enhance opportunities for unconfined type of recreation the indicators could be based on the items included in the unconfined wilderness experience scale. This incorporates science into the planning process. For example, "number of desirable destinations not accessed by system trails" could be an indicator of unconfined type of recreation. It is derived from the item statement "you feel like you can explore away from trails". It is measurable and can be enumerated. It is stable and wouldn't require monitoring every single year. Some wilderness areas may already have wilderness monitoring protocol information on user created trails which may help managers tally destinations that are already being utilized by visitors who are exploring on their own. Instead of treating user created trails as threats to wilderness character, this condition may be reframed as a metric for opportunities to explore, which enhances opportunities for unconfined type of recreation. Similarly, with the untethering component, the amount of wilderness free of internet or phone reception is measurable and quantifiable, and enhances the

opportunity to untether from phones and e-mail. In the Alpine Lakes Wilderness there were spots that I could call home while I was a wilderness ranger.

To illustrate another indicator that may be developed from the scale established by this study we can look to the item statement "you just pack some things and go". This would be simple to enumerate via counting the number of trips that include less than two hours of planning. During the NVUM surveys or conducting surveys on wilderness character visitors could be asked "how long did it take to plan this trip"? Or "for this trip did you just pack some things and get into the wilderness"? Obviously the question wording would need revision and pre-testing but even a statement like "you just pack some things and go", could serve to develop an indicator of opportunities for unconfined type of recreation.

Deriving potential future indicators from the unconfined wilderness experience scale established in this study has two functions. The first being the incorporation of science into monitoring the quality "solitude or a primitive and unconfined type of recreation" within the wilderness character monitoring framework. The current indicator for this quality 'number of managerial regulations placed on the visitor' lacks scientific establishment. Second, it has the possibility to use indicators that are more relevant or valid to the quality being monitored. It is realized that not all enhancing options as mentioned in recommendation 1 or that all the item statements contained in the unconfined wilderness experience scale may fit into the current monitoring frameworks and this is why it is so crucial to continue researching and thinking about unconfined.

Recommendation 3: If managers continue monitoring threats we should be measuring and minimizing a number of threats to unconfined type of recreation. The first threat is connectivity to phones and e-mail while in the wilderness. Wilderness areas that are near expanding urban

settlements are facing the most risk for losing their lack of cell phone service. As I mentioned in the Alpine Lakes Wilderness, there are already areas within the wilderness where connection and reception are available. This responsibility must be heeded by high level wilderness managers and policy makers in Washington D.C. where technology and telecommunications companies lobby for continued expansion of network coverage. As a result of this science we now know that untethering from phone and e-mail and the associated work responsibility are among the most important dimensions of unconfined wilderness experiences.

The second threat is permitting processes that require itineraries and campsite registration for each night. If the visitor is unable to change their plans or make their own schedule and plans as a result of management modification of the itinerary, the experience has the potential to feel much less unconfined. Not having permits required and not having restrictions placed on where you can camp were both important setting attributes to respondents in this study for the opportunity to have an unconfined experience and these conditions should be maintained in wilderness.

The third threat is camps that are within sight and sound of other camps. Having campsite choices that were out of sight and sound of other camps was the highest rated setting attribute for the opportunity to have an unconfined wilderness experience for this studies respondents. If campsites are already being monitored in wilderness for ecological reasons with limits of acceptable change or for wilderness character monitoring, campsites can be easily identified that fall within sight and sound of another camp and they could be naturalized.

Recommendation 4: Based upon the unequal distribution of research that has focused on solitude it is recommended that the agencies that manage wilderness areas develop and administer a survey of wilderness visitors to measure opportunities for an unconfined type of

recreation. This recommendation comes as an answer to the problem statement established in chapter one that criticizes the lack of focus on unconfined but also underscores the importance of future research opportunities highlighted in this chapter. This study was the first to focus exclusively on unconfined type of recreation and considering the age of the Wilderness Act it is somewhat surprising that wilderness scholars haven't focused on this dimension of the wilderness experience more.

6.6 - Summary and Conclusion

The principal aim of this study was to increase our knowledge surrounding an unconfined type of recreation in wilderness areas. This three word phrase used in the Wilderness Act has had little empirical focus within wilderness visitor experience research. A 20-item quantitative research instrument was developed and found to be valid and reliable when considering what is important to feeling unconfined while in the Selway-Bitterroot Wilderness area for this study's respondents. This scale included four components that were labeled, Free Choice, Untethering from Responsibility, Making Own Plans, and Exploring. This is a first step in understanding what is important to feeling unconfined and how wilderness visitors understand this concept. In addition to developing this scale the Perceived Freedom in Leisure Scale was administered to survey respondents. Overall this showed that the majority of this study's respondents display high leisure functioning. Three clusters were formed based on the 20-item unconfined wilderness experience scale which showed that there are separate groups within this sample that placed different levels of importance on different scale components. Although these groups were distinct, the groupings were not found to be dependent upon any trip or visitor characteristics. When we manage for outstanding opportunities for unconfined type of recreation experiences we are not managing for a certain type of visitor. We are not managing unconfined experiences for

only overnight visitors or only highly experienced wilderness visitors, or only hikers. We need to realize that all wilderness visitors have ideas about what is important to feeling unconfined and some will place more importance on untethering from responsibility and some will place more importance on free choice and making their own plans.

This study serves as a call to managers to learn more about unconfined wilderness experiences. The question of why unconfined experiences has received so little attention in the wilderness is a difficult question to answer. An obvious, but simple, answer is that unconfined type of recreation is a vague and ambiguous term. Some terminology included in the Wilderness Act was purposefully left ambiguous to allow for manager discretion when administering wilderness areas. Yet this is not an excuse to focus on more concrete concepts such as solitude while ignoring other concepts such as unconfined. It may be that managers of wilderness feel solitude is more important to the wilderness experience and that by achieving solitude they are achieving unconfined as well. Yet it seems that management practices for preserving solitude have the potential to be at odds with providing opportunities for unconfined experiences. Providing opportunities for solitude while important cannot be thought of as more important than providing opportunities for unconfined type recreation. Unconfined experiences are understood by the visitor and a vital part of the wilderness experience. It is my hope that the work presented in this study will be a catalyst for further research on what is meant by unconfined type of recreation and what is important to feeling unconfined while visiting our nation's most special public lands.

Appendix A – Survey Instrument

What is your current e-mail address?

Indicate your length of visit to the Selway-Bitterroot Wilderness on this trip.

[ ] Day trip
[ ] Overnight trip

These questions deal with how you **feel about your wilderness experiences.**

During wilderness activities there are often moments when I feel really involved in what I am doing.

[ ] Strongly agree
[ ] Somewhat agree
[ ] Neither agree nor disagree
[ ] Somewhat disagree
[ ] Strongly disagree

I have the skills to do wilderness activities in which I want to participate.

[ ] Strongly agree
[ ] Somewhat agree
[ ] Neither agree nor disagree
[ ] Somewhat disagree
[ ] Strongly disagree

What is the zip code where you live?_____

Selway-Bitterroot Wilderness Visitor Survey - Unconfined

Thank you for helping us understand your wilderness experience. The information you provide will help fulfill my thesis requirements for a Master of Science in Recreation Management at the University of Montana. Your participation is completely voluntary and appreciated. Your responses will be completely confidential and anonymous.

Thank you for participating in this research project about wilderness experiences. This online survey should take about 10 minutes to complete. Participation is voluntary, and responses will be kept anonymous.

You have the option to not respond to any questions that you choose. Participation or non-participation will not impact your relationship with the University of Montana. Submission of the survey will be interpreted as your informed consent to participate and that you affirm that you are at least 18 years of age.

If you have any questions about the research, please contact the Principal Investigator, Jon Dorman, via email at jonathan.dorman@umontana.edu or the faculty advisor Dr. William Borrie at bill.borrie@umontana.edu. If you have any questions regarding your rights as a research subject, contact the UM Institutional Review Board (IRB) at (406)243-6672.

** I have read the above information and agree to participate in this research project.*

- ○ Yes
- ○ No

Section 1 of 4.

Please tell us some things about your most recent trip to the Selway-Bitterroot Wilderness.

The term "Wilderness" in this questionnaire means the roadless, undeveloped country reached only by trails or rivers. These questions refer only to the wilderness portion of your trip.

Was this trip?

- ○ A Day Trip
- ○ An Overnight Trip

Skip To: QID3 If Was this trip? = A Day Trip

How many nights did you spend in the Selway-Bitterroot Wilderness on this trip?

_____

How did you travel in the Wilderness on this trip?

Which of the following activities did you do on this visit? You can select multiple activities.

- ☐ Hiking
- ☐ Horseback riding
- ☐ Backpacking
- ☐ Camping
- ☐ Fishing
- ☐ Hunting
- ☐ Swimming
- ☐ Nature Study (wildlife viewing, bird watching, identifying wildflowers, etc.)
- ☐ Climbing (using special equipment, ropes, etc.)
- ☐ Taking pictures (Photography)
- ☐ Rafting or other boating
- ☐ Running
- ☐ Other _____

The Wilderness Act of 1964 directs the Forest Service to provide outstanding opportunities for solitude or a primitive and unconfined type of recreation. We are interested in what an unconfined experience feels like for you.

In general, for an **unconfined wilderness experience, how important is it you feel like...**

	0	1	2	3	4	5	6	7	8	9
You are exploring	○	○	○	○	○	○	○	○	○	○
You make your own schedule	○	○	○	○	○	○	○	○	○	○
You are untethered from e-mail	○	○	○	○	○	○	○	○	○	○
You can roam wherever you want	○	○	○	○	○	○	○	○	○	○
You have the skills to go anywhere you want	○	○	○	○	○	○	○	○	○	○
You can change your plans	○	○	○	○	○	○	○	○	○	○
There are no rules	○	○	○	○	○	○	○	○	○	○
You see wildlife unexpectedly	○	○	○	○	○	○	○	○	○	○
You can explore away from trails	○	○	○	○	○	○	○	○	○	○
You're enjoying what you're doing so much you lose track of time	○	○	○	○	○	○	○	○	○	○

In general, for an **unconfined wilderness experience, how important is it you feel like...**

	0	1	2	3	4	5	6	7	8	9
You make your own plans	○	○	○	○	○	○	○	○	○	○
You are free from work responsibilities	○	○	○	○	○	○	○	○	○	○
You just pack some things and go	○	○	○	○	○	○	○	○	○	○
You make your own way	○	○	○	○	○	○	○	○	○	○
You are in wide open spaces	○	○	○	○	○	○	○	○	○	○
You are going somewhere new	○	○	○	○	○	○	○	○	○	○
You feel like you could keep going	○	○	○	○	○	○	○	○	○	○
You can camp anywhere	○	○	○	○	○	○	○	○	○	○
You can go at your own pace	○	○	○	○	○	○	○	○	○	○
You are untethered from your phone	○	○	○	○	○	○	○	○	○	○

Section 2 of 4.

In general, how important are each of the following conditions to your **opportunity to have an unconfined wilderness experience?**

	Extremely important	Very important	Moderately important	Slightly important	Not at all important	Not sure
The ability to have a campfire	○	○	○	○	○	○
Having no trees damaged in your campsites	○	○	○	○	○	○
Not seeing mileage signs	○	○	○	○	○	○
Having trails that are completely primitive (no bridges, little maintenance)	○	○	○	○	○	○
No permit is required	○	○	○	○	○	○
Not seeing regulation signs	○	○	○	○	○	○
Not seeing other groups	○	○	○	○	○	○
Having campsite choices that are out of sight and sound of others	○	○	○	○	○	○
Not having restrictions placed on where you can camp	○	○	○	○	○	○
Not having groups pass within sight and sound of your camp	○	○	○	○	○	○
Not having restrictions placed on where you can travel	○	○	○	○	○	○
Not having other groups **camping** within sight and sound of your camp	○	○	○	○	○	○
Seeing mileage signs	○	○	○	○	○	○

We've just asked you how important the following conditions are to having an unconfined wilderness experience, now rate **how satisfied you are with these conditions** on your most recent trip to the Selway-Bitterroot Wilderness?

	Extremely satisfied	Somewhat satisfied	Neither satisfied nor dissatisfied	Somewhat dissatisfied	Extremely dissatisfied	Not sure	N/A
The ability to have a campfire	○	○	○	○	○	○	○
Having no trees damaged in your campsites	○	○	○	○	○	○	○
Not seeing mileage signs	○	○	○	○	○	○	○
Having trails that are completely primitive (no bridges, little maintenance)	○	○	○	○	○	○	○
No permit is required	○	○	○	○	○	○	○
Not seeing regulation signs	○	○	○	○	○	○	○
Not seeing other groups	○	○	○	○	○	○	○
Having campsite choices that are out of sight and sound of others	○	○	○	○	○	○	○
Not having restrictions placed on where you could camp	○	○	○	○	○	○	○
Not having groups pass within sight and sound of your camp	○	○	○	○	○	○	○
Not having restrictions placed on where you could travel	○	○	○	○	○	○	○
Not having other groups **camping** within sight and sound of your camp	○	○	○	○	○	○	○
Seeing mileage signs	○	○	○	○	○	○	○

Is there anything else about feeling unconfined in wilderness that we haven't asked?

_____

_____

_____

_____

_____

Section 3 of 4.

The following section deals with how you feel about your wilderness experiences. Please read each of the following statements and check the response that best reflects you're feeling about each item.

Please mark your level of agreement with the statements below.

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
My wilderness activities help me to feel important	○	○	○	○	○
I know many wilderness activities that are fun to do	○	○	○	○	○
I can do things to improve the skills of the people I do wilderness activities with	○	○	○	○	○
I have the skills to do wilderness activities in which I want to participate	○	○	○	○	○
Sometimes during a wilderness activity there are short periods of time when I feel I can do anything	○	○	○	○	○
It is easy for me to pick a wilderness activity to do	○	○	○	○	○
I can do things during wilderness activities that will make other people like me more	○	○	○	○	○
My wilderness activities enable me to get to know other people	○	○	○	○	○
I can make a wilderness activity as enjoyable as I want it to be	○	○	○	○	○
I can do things during a wilderness activity that will enable everyone to have more fun	○	○	○	○	○

Please mark your level of agreement with the statements below.

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
I usually decide with whom I do wilderness activities	○	○	○	○	○
I am good at the wilderness activities I do with other people	○	○	○	○	○
I am able to be creative during my wilderness activities	○	○	○	○	○
I am good at almost all the wilderness activities I do	○	○	○	○	○
I can enable other people to have fun during wilderness activities	○	○	○	○	○
During my wilderness activities there are often moments when I feel really involved in what I am doing	○	○	○	○	○
I can usually persuade people to do wilderness activities with me, even if they don't want to	○	○	○	○	○
I can make almost any wilderness activity fun for me to do	○	○	○	○	○
I participate in wilderness activities which help me make new friends	○	○	○	○	○
I can make good things happen when I do wilderness activities	○	○	○	○	○

Please mark your level of agreement with the statements below.

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
When participating in wilderness activities there are times when I really feel in control of what I am doing	○	○	○	○	○
I can do things to make other people enjoy doing wilderness activities with me	○	○	○	○	○
When I feel restless, I can do wilderness activities that will help calm me down	○	○	○	○	○
Sometimes when I do wilderness activities, I get excited about what I am doing	○	○	○	○	○
I usually have a good time when I do wilderness activities	○	○	○	○	○

Section 4 of 4.

Almost done!

Have you ever visited a Wilderness area before this trip?

○ Yes

○ No

Skip To: If Have you ever visited a Wilderness area before this trip? = No

---

About how many other Wilderness areas have you visited in your lifetime?

- ○ 1-5 other wilderness areas
- ○ 6-10 other wilderness areas
- ○ 11-15 other wilderness areas
- ○ More than 15 other wilderness areas

Including this visit, how many trips have you taken to a Wilderness area in your lifetime?

- ○ 1-5 trips
- ○ 6-10 trips
- ○ 11-15 trips
- ○ More than 15 trips

Have you ever visited the Selway-Bitterroot Wilderness before this trip?

- ○ Yes
- ○ No

Skip To: If Have you ever visited the Selway-Bitterroot Wilderness before this trip? = No

---

Including this visit, about how many trips have you taken to the Selway-Bitterroot Wilderness in your lifetime?

- ○ 1-5 trips
- ○ 6-10 trips
- ○ 11-15 trips
- ○ More than 15 trips

What is the zip code of your primary residence?

_____

How many people are in your group on this trip?

_____

What is your sex?

- ○ Male
- ○ Female
- ○ Prefer not to answer

What is your age?

- ○ Under 18
- ○ 18 - 24
- ○ 25 - 34
- ○ 35 - 44
- ○ 45 - 54
- ○ 55 - 64
- ○ 65 - 74
- ○ 75 - 84
- ○ 85 or older
- ○ Prefer not to answer

What is the highest level of education you have completed?

- ○ Less than high school
- ○ High school graduate
- ○ Some college
- ○ 2 year degree
- ○ 4 year degree
- ○ Professional degree
- ○ Doctorate
- ○ Prefer not to answer

Is there anything else you wish to tell us about your trip to the Selway-Bitterroot wilderness?

_____

_____

_____

_____

_____

Appendix B – List of Tables and Figures

List of Figures

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