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## Recreation specialization and the effects on leave no trace attitudes among the climbers of Mount St. Helens

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RECREATION SPECIALIZATION AND THE EFFECTS ON LEAVE NO TRACE  
ATTITUDES AMONG THE CLIMBERS OF MOUNT ST. HELENS

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A Thesis

Presented To

Eastern Washington University

Cheney, Washington

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In Partial Fulfillment of the Requirements

for the Degree

Master of Science in Physical Education

Sports and Recreation Administration

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By

Luke W. Parsons

Summer 2013

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## MASTER'S THESIS

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## **Chapter I**

### **Introduction**

Mount St. Helens is an 8328-foot tall volcano located in southwest Washington State. This mountain has become a major tourist destination for the region, partially due to the famous 1980 eruption that gained worldwide media attention. The first recorded climb of this mountain was in 1858 (Williams, 1988) and, since that time, thousands of mountain climbers, traditionally called mountaineers, have scaled the peak. After the 1980 eruption, the desire to experience Mount St. Helens and to climb the peak rose significantly. That increase is still evident today. The managers of the Mount St. Helens climbing program indicate that mountain climbing participation numbers have been on the rise since 2007 and, in 2012, over 15,000 climbing permits were issued. Ewert (1990) was the first to study this population of mountain climbers and noted that these climbers did not appear to be the typical, historical mountaineering population. Ewert (1990) found that these climber's motivations were associated with seeing the crater or adventure and excitement instead of the more traditional motivations of skill development and solitude.

Powers (1993) defines mountaineering as a "summit oriented pastime" (p. 5). This activity has gained in participation within the United States over the past decade (Pomfret, 2012) and so have many outdoor sports categorized as "adventure recreation activities" (Outdoor Recreation Coalition of America, 1993). Adventure activities are defined by Ewert and Hollenhorst (1997) as "recreational activities that contain structural components of real or perceived danger and usually involve a nature environment setting

in which the outcome is uncertain but influenced by the participant" (p. 21). Adventure activities include sports such as mountaineering, rock climbing, backcountry skiing, and others (Ewert & Hollenhorst, 1997). These activities are not considered mainstream American sports, but they are predicted to experience an additional six to eighteen percent increase in participation rates over the next fifty years (Cordell, 2012). Providing further support for this concept, Ewert, et al. (2006) state,

within the past three decades, adventure pursuits on public lands have grown, both in terms of overall popularity and activity diversity. Due to their high dependence upon large, undeveloped landscapes, participants often look to public land resources as the venue for these activities. (p. 125)

From a national perspective, according to the 2010 U.S. Census Bureau, there was a 9.7% increase in the U.S. population from 2000 to 2010 (281.4 million to 308.7 million). A 2012 study conducted by the Outdoor Foundation found that "outdoor recreation reached the highest participation level in the past five years. Nearly half of the U.S. population enjoyed various forms of outdoor recreation" (p. 1). From a regional perspective, the population increase is also documented in recreation research here in the Northwest (Alaska, Washington, Oregon).

The population in the three states is increasing, which means demand for recreation will also increase, all other things being equal. Many newcomers to the Pacific Northwest have relatively high levels of education and income and come for the natural amenities, including outdoor recreation opportunities. (Hall, Heaton, & Kruger, 2009, p. 88)

There are many positive economic based effects of increasing outdoor recreation participation, including contributing an estimated \$730 billion dollars to our economy annually (Southwick, Bergstrom and Wall, 2009). In addition, from a social viewpoint, participating in outdoor recreation can lead to a higher quality of life and offers individuals a chance to connect with nature (Mannell & Kleiber, 1997). However, the increasing participation in the nation's wild and protected areas does bring certain number of negative side effects including crowding and possible environmental degradation (Manning, 2011).

The overall increase in population and recreation participation has turned up the pressure on the federal government, and the various land management agencies that supervise these recreation resources, to appropriately protect these areas from use related damage. The U.S. Forest Service (USFS), the National Park Service (NPS), The Bureau of Land Management (BLM), and the U.S. Fish and Wildlife Service (USFWS), all have the duty, as worded in their mission statements, to allow use of the nation's wild areas, while at the same time, maintain a level of sustainability so that future generations can use and enjoy these lands. To help reach this level of sustainability, these agencies, in cooperation with other partners, have assisted in the development of the Leave No Trace Center for Outdoor Ethics. This organization seeks to help make outdoor enthusiasts aware of their negative impacts, and through various education-based strategies, encourage outdoor behaviors that limit the ecological damage caused by human use (Leave No Trace, 2012).

Land managers have studied recreation users for several decades in an attempt to better understand their interactions with outdoor resources (Manning, 2011). Over time,

several classifications of recreation activities and users have been formed. Dunlap and Heffernan (1975) were among the first to categorize recreation activities as non-consumptive, often called appreciative, (e.g. hiking and nature viewing) consumptive, (e.g. hunting and fishing) and finally, Jackson (1986) added the category of mechanized (e.g. off road driving, all terrain vehicles). These three groups have been shown to have different reasons for engaging in outdoor activities and differing attitudes in regard to environmental impact (Manning, 2011). The educational messages and outdoor behaviors that the Leave No Trace (LNT) organization encourage are designed specifically for the non-consumptive outdoor recreation users. Recently, a small number of studies have begun to evaluate the effectiveness of the LNT program by assessing the attitudes of visitors regarding proper behavior in outdoor areas.

An additional theoretical construct termed, recreational specialization, was developed by Bryan (1977), which also attempted to classify recreations users based on previous experience, knowledge, and commitment to the sport or activity under investigation. Several studies have been conducted that explore the connection between recreation specialization and environmental attitudes (Katz, 1981; Kauffman, 1984; Kuentzel & Heberlein, 1992; Wellman & Roggenbuck, 1992; Mowen, Williams & Graefe, 1997; Thapa, 2000; and Dyck, Schneider, Thompson & Virden, 2003) however, only one study has been located that specifically explores recreation specialization and LNT (Dyck, Schneider, Thompson & Virden, 2003).

Currently, there is limited research that connects the construct of recreation specialization and the LNT attitudes of recreation users. Only one study has previously evaluated a person's attitude related to LNT, while in the mountain environment and how

this is influenced by specialization in this sport (Dyck, et al., 2003). Therefore, the purpose of this study was to examine the relationship between recreational specialization and the understanding of LNT land use ethics among the mountain climbers of Mount. St. Helens.

**Recreation specialization.** Bryan (1977) developed the recreation specialization psychological construct. This theory is defined as, "a continuum of behavior from the general to the particular, reflected by equipment and skills used in the sport and activity setting preferences" (Bryan, 1977, p. 175). Based on this original study of fisherman, Bryan (1977) stated that anglers could be placed into one of four distinct categories contingent on their level of specialization: occasional fishermen, generalists, techniques specialists, and technique-setting specialists (p. 178). Bryan (1977) further concluded that each level of specialization has specific preferences that ultimately defined each group, and that understanding these preferences could aid land managers in meeting these group's needs. The classification system that Bryan (1977) developed has allowed researchers to compare the distinct tendencies and characteristic of different people participating in the same recreational activity. Additional research and development of this construct has continued to support Bryan's (1977) specialization continuum and has been used to evaluate recreationists in a variety of outdoor sports (Manning, 2011).

**Leave No Trace.** Due to the increasing participation rates, and the negative ecological issues that are associated with this increase, the federal agencies have developed and implemented many programs that are aimed at protecting our wild and scenic places through public education. The primary educational program, called Leave No Trace (LNT), is designed to counteract the negative impacts of non-consumptive, or

appreciative, outdoor recreation, with consumer education about minimum impact techniques and practices.

The modern LNT message was formed as a result of nearly 40 years of research and work. In 1991, LNT was formally developed through the partnership of the USFS with the National Outdoor Leadership School (NOLS) and by 1994, LNT Inc. became a fully registered 501 ©3 non-profit organization (Marion & Reid, 2001). The organization's mission statement currently reads, "the Leave No Trace Center for Outdoor Ethics teaches people how to enjoy the outdoors responsibly" (Leave No Trace, 2012). This rather broad statement is provided further direction by incorporating the seven modern LNT principles developed by this institution. The seven principles include:

1. Plan Ahead and Prepare
2. Travel and Camp on Durable Surfaces
3. Dispose of Waste Properly
4. Leave What You Find
5. Minimize Campfire Impacts
6. Respect Wildlife
7. Be Considerate of Other Visitors (Leave No Trace, 2012)

Research from numerous studies has documented that the LNT program is an effective tool in reducing the negative ecological impacts associated with human-

powered outdoor recreation activities (Manning, 2011). However, the widespread comprehension of LNT has seen limited research (Vaigas, 2009).

### **Problem Statement**

Currently, there is a deficient amount of literature that enables managers to understand the connection between the construct of recreation specialization and comprehension of the 7 LNT principles. Research of this topic among the mountaineering population has been limited, with only one study currently known in existence that specifically addresses this issue (Dyck, Schneider, Thompson & Virden, 2003). However, this study fails to represent a heterogeneous mountaineering population. Due to the fact this study evaluated an organized mountaineering club, their sample may not be an accurate representation of all who climb mountains. Furthermore, the various federal agencies have implemented the LNT message into many aspects of their recreation offerings. Yet despite the extensive implementation of this program, as a visitor education tool, the research base remains lacking (Vaigas, 2009; Cole, 1998; Marion and Reid, 2001; Miller et al., 2001). This study attempted to partially fill this knowledge gap.

### **Operational Definitions**

1. *Mountaineering*: a summit oriented past time (Powers, 1993, p. 5).
2. *Recreational Specialization*: a continuum of behavior from the general to the particular, reflected by equipment and skills used in the sport and activity setting preferences (Bryan, 1977, p. 177).
3. *Leave No Trace*: the most pervasive environmental ethics communication initiative in existence and is designed to encourage human powered recreationists

in backcountry settings to minimize their impacts upon the landscape (Vaigas, 2009, p. 11).

### **Hypotheses**

Ha<sub>1</sub>: There will be a significant difference between the attitudes of higher specialized mountaineers and lower specialized mountaineers regarding the Leave No Trace principles.

Ha<sub>2</sub>: There will be a significant difference regarding the comprehension of the Leave No Trace principles between members of organized mountaineering groups and non-members.

Ha<sub>3</sub>: There will be a significant difference in mean specialization level of the climber over the duration of the Mount St. Helens climbing season.

### **Limitations**

This study was limited to the registered mountaineering population of Mount St. Helens. Therefore, any results are not transferable to the greater public, or larger mountaineering populations. The format of this study consisted of an online, self-administered, survey, and therefore, this study was limited to individuals who had access to a computer, the Internet, and are literate.

### **Delimitations**

This study was delimited to the entire population of registered mountaineers of Mount St. Helens who were 18 years of age or older. Mountaineers of other regional mountains were not included in this study. All mountaineers who climb Mount St. Helens

between April 1st and October 31st are required to obtain a climbing permit, using an Internet based registration system prior to arriving at the trailhead. Only individuals who have acquired a climbing permit through this system were contacted. No attempt was made to gain information from individuals who fail to register using this system and climb this mountain without appropriate authorization.

### **Assumptions**

Several assumptions were made in regard to this study. First, due to the nature of the survey instrument, it is assumed that participants are literate and have access to the Internet. Second, it is assumed that the participant who was contacted completed the survey instrument himself or herself, and responded to the questions honestly and thoroughly. It will also be assumed that the online climbing database is complete, and holds accurate information regarding participant contact information. Finally, it is assumed that individuals who participated in this study were at least 18 years of age or older.

### **Significance**

This study was designed to add to the body of knowledge relating to the mountaineering population in this region, and is designed to offer insight to recreation users' overall understanding of the LNT principles. Currently, little information about the relationship between recreation specialization and LNT understanding among this population exists, and no information exists in which a study has sampled a large mountaineering population. By assessing this population through the construct of recreation specialization, inferences may be made regarding where these individuals are

positioned on Bryan's (1977) continuum of specialization and potential LNT understanding.

Manning (2011) states that newcomers to an activity may act inappropriately if they are unaware of proper practices. Therefore, if managers are able to identify and predict when mountaineers with less LNT understanding are accessing this resource, it may be appropriate to increase educational programs, ranger enforcement, or decrease the amount of users allowed on the mountain to reach desired resource protection goals. Similarly, if mountaineers are surveyed who report appropriate LNT understanding, managers may consider increasing the number of individuals who are allowed access to the mountain above the current 100 allowed per day with little worry of increased ecological impact.

The subsequent chapter will consist of a literature review that explores outdoor recreation participation trends, the unique draw of Mount St. Helens, the history of minimum impact education, the construct of recreation specialization, and an examination of research on the mountaineering population.

## Chapter II

### Review of Literature

This literature review will explore several aspects of recreational specialization and the connection with Leave No Trace practices. The purpose of this study is to examine the relationship between recreational specialization and the understanding of Leave No Trace land use ethics among the mountain climbers of Mount St. Helens. This review has been separated into five sections: outdoor recreation trends, the unique draw of the Mount St. Helens National Volcanic Monument, the development and implementation of minimum impact education, the concept of recreation specialization, and an examination of research on the mountain climbing population.

#### **Outdoor Recreation Trends.**

Within this section, trends relating to outdoor recreation specifically, hiking and mountaineering within the United States, will be explored. Understanding these trends is an important component to better understand the users, and may help guide future planning of recreational resources. This section has been separated into two parts outdoor recreation participation within the United States, and regional hiking and mountaineering trends.

**Outdoor recreation participation within the United States.** One method researchers have used to assess trends in outdoor recreation is by simply tracking participation (Manning, 2011). However, "use measurement is often difficult due to the dispersed nature of outdoor recreation activity" (Manning, 2011, p. 23). As a result, researchers have employed diverse tactics to complete large participation based

assessments. This has resulted in data that ultimately allow managers to gain a picture of past trends in outdoor recreation participation (Manning, 2011). By examining the participation rates over many years, both researchers and managers are able to review past trends and predict for future needs.

Information on recreation use and users has many potential applications for recreation management, including monitoring the popularity of recreational activities; designing recreation facilities and services; planning budgetary, personnel, and other resource needs; conducting public information and education programs; and evaluating the efficiency and equity of public outdoor recreation. (Manning, 2011, p. 56)

Recent literature suggests, based on certain participation numbers, Americans are moving away from nature and participating in fewer outdoor activities. Pergams and Zaradic (2006) claim that the U.S. population and culture is moving away from outdoor activities into an era of, "videophilia," which they define as, "the new human tendency to focus on sedentary activities involving electronic media"(p. 387).

In contrast, many academic and federal agency researchers believe that, overall, outdoor recreation has actually been increasing over the past several decades. (Cordell, Betz & Green, 2008). "Simply looking at reported public land visitation and at traditional hunting and fishing activities tells only part of the trend story" (Cordel, Betz & Green, 2008, p.9).

Beginning in the 1950s, the USFS began estimating recreation use, and has maintained records ever since (Hall, Heaton & Kruger, 2009). Since the 50s, additional

organizations and researchers have added data to the national trends in outdoor recreation.

According to the Outdoor Foundation (2012), "In 2011, outdoor recreation reached the highest participation level in the past five years. Nearly half of the U.S. population enjoyed various forms of outdoor recreation" (p. 1). In addition, the most current projections from the National Survey on Recreation and the Environment (NSRE) administered by the USFS and other partners states that, participation rates in outdoor activities on federal lands will continue to rise as far as the projections extend, which is currently 2060 (Bowker, Askew, Cordell, & Bergstrom, 2011). Individual sports and activities have shown variability year to year, but overall outdoor recreation participation appears strong (Bowker et al. 2011).

Among outdoor recreation activities, running, jogging, and trail running are the most popular with an estimated 51.5 million participants, while hiking also continues to be very popular at 34.5 million participants (The Outdoor Foundation, 2012). According to Bowker et al., (2011) challenging activities, which include rock climbing, mountain climbing, mountain biking and caving, currently engage approximately 25 million adults. The numbers of people climbing mountains were down in the early part of the 2000s, but by 2008, the sport had recovered and made slight increases in participation (Cordell, 2012). Furthermore, mountain based challenging activities, which include mountain climbing, and all forms of skiing, both resort and backcountry, are predicted to increase drastically over the next 50 years (Cordell, 2012).

**Regional hiking and mountaineering trends.** The most recent formal recreation survey conducted within the Gifford Pinchot National Forest (GPNF), Graefe, Burns, Robinson and Nyaupane (2002) shed light on many recreation based trends that are occurring within the GPNF and the Mount St. Helens district.

The Mount St. Helens district showed high number of day users, 83%, who mostly enjoy sightseeing and hiking or walking. Fewer than 10% of visitors stay overnight, and 64% of these campers reported staying only one night (Graefe et al, 2002). It was also shown that, 82% of people who camped in this district did not use any developed site (Graefe et al., 2002). Overall satisfaction with recreation opportunities and user satisfaction within the Mount St. Helens National Volcanic Monument (MSHNVM) was reported as high.

Short-term use of this area appears to be the norm, and it is interesting that few of the overnight campers stay in a developed campground. However, one of the limitations to the Graefe et al. (2002) study is that none of the surveys completed appear to assess any mountain climbers. Mountaineering, or mountain climbing, are not mentioned within this study as either a part of the MSHNVM or the GPNF, even though there are two prominent mountaineering destinations located within this forest, Mount St. Helens and Mt. Adams.

The closest regional mountaineering group, the Mazamas, a Portland, Oregon based mountaineering organization, has seen their membership numbers increase from 2849 total members in 2008 to 3325 members in 2012 (D. Wilson, personal communication, January 2013). This membership increase is another affirming sign that

mountaineering interest within this region is currently increasing, much like the predicted national trends.

Participation figures show the numbers of people climbing Mount St. Helens has been increasing. In 2011, the total number of climbing permits sold was 13,851, and in 2012, the number has increased to over 15,000 (G. Walker, personal communication, December, 2012). Climbing this mountain appears to be an activity that is growing in popularity, however, research assessing this population is almost non-existent (Gilden, 2004; Ewert, 1990).

This section has explored some national and local level trends in outdoor recreation participation that are specific to this research. In both cases, participation in outdoor recreation activities within the mountain environment appears to be stable or slightly rising. The Mount St. Helens area has been a popular recreation destination for over 30 years, in large part due to the world famous 1980 eruption. The next section will explore what makes this area such a distinct recreation destination.

### **The Unique Draw of the Mount St. Helens National Volcanic Monument**

This section will discuss the creation of the MSHNVM, and some of the recreational activities that take place in the surrounding area. This section has been separated into four parts; the history, the 1980 eruption, the creation of the MSHNVM; and recreation within the monument.

The GPNF covers over 1.4 million acres within southwest Washington State. This area provides many opportunities for individuals who are looking to interact with this national forest, both industrial and recreational.

The national forests in Washington and Oregon are important to the life and lifestyles of the people who reside in the Pacific Northwest. The national forests in Region 6 sit atop the heavily forested mountain ranges and provide scenic settings, recreation, water, fishing, timber, grazing, and many other opportunities. They define the Pacific Northwest. (Williams, 2009, p.1)

The 110,000-acre MSHNVM lies within the GPNF. Located just a 70 mile drive north of Portland, Oregon, and 150 mile drive south from Seattle, Washington, this active volcano attracts in excess of 450,000 visitors each year to information and visitor centers alone (U.S. Forest Service, Recreation Report, 2011).

Mount St. Helens and the immediate surrounding areas have been a public recreation destination for many generations. Previously, the majority activities such as hiking, camping, fishing, swimming, and boating took place on the north side of the mountain (Tilling, Topinka & Swanson, 1990). There were popular developed recreation destinations including several forest service and private campgrounds. Prior to 1980, recreation patterns were similar to other northwest forests. The majority of this area remained rural, and until 1980, the bulk of the residents living in the region were associated with timber harvesting (Vielbig, 1997).

**The 1980 Eruption.** In December of 1978, the United States Geological Survey (USGS) began to warn state and forest officials that seismic activity occurring at Mount St. Helens could potentially be hazardous (Tilling et. al., 1990). Most locals thought nothing of the warnings, and continued to carry on about their daily routines near the mountain. For the next two years the mountain remained quiet (Tilling et al. 1990).

In mid March 1980, the mountain re-awoke and earthquakes within the mountain began to increase in number and intensity.

On Sunday May 18 the unimaginable happened- the mountain blew up! The huge explosion at 8:32 a.m., heard in many parts of Washington and northern Oregon, blasted 1,314 feet of summit into the atmosphere, buried picturesque Spirit Lake, and flattened many thousands of acres of prime timber and recreation land.

(Williams, 2009, p. 270)

In the days that followed, pressure mounted from several environmental groups to protect this area as a national park, however, the United States Congress soon passed legislation that created a new Volcanic Monument (Williams, 2009).

**The creation of the MSHNVM.** On August 27<sup>th</sup>, 1982, President Ronald Regan and Congress signed House Report 105-704, which officially created the 110,000-acre monument to recognize and protect this land area. The USFS previously managed this area, and was now charged with organizing and managing the newly developed MSHNVM. The draft Environmental Impact Statement Comprehensive Management Plan (CMP) was released in 1982, soon to be followed by the final version in 1985. This report was established to guide the planning and implementation of all activities within the MSHNVM. Stated within the CMP (1985), is that the MSHNVM has been set-aside, "for public education, interpretation and recreation, and for research" (CMP, 1985, p.i).

For the past three decades scientists from around the world have come to study this unique geologic area. Meanwhile, recreation activities have become one of the main attractions to this area and now recreation services account for a substantial amount of the

Mount St. Helens district budget (USFS, Forest Facts, 2011).

**Recreation within the monument.** Recreation and tourism based attractions have become one of the primary focuses for this area.

The eruption of Mt. St. Helens on May 18, 1980 changed the face of recreation on the mountain. Although many recreational services were suspended for several years after the eruption, the mountain gained international attention and the number of visitors to the area grew enormously. (Gilden, 2004, p.2)

Since 1983, numerous public education and interpretive centers were developed and have opened. Since the early 1980s, “tens of thousands of visitors flocked to the areas surrounding Mount St. Helens” (Tilling, et. al., 1990, p.51). The draw to experience this unique geologic landscape has been very high, and visitation numbers for the monument and surrounding area in the late 1990s were estimated at 3 million annual visitors (Vielbig, 1997). The most current estimates are that 1.1 million people visit the GPNF, and use surrounding resources each year (USFS, Forest Facts, 2011). The Johnston Ridge Observatory and the Coldwater Interpretive Center are currently the two most popular educational sites. In addition, many visitors engage in one of the other recreational opportunities in and around the MSHNVM such as the large trail system (USFS, Forest Facts, 2011).

**2004 closure.** In 2004, all recreational activities taking place on Mount St. Helens were suspended due to the sudden onset of hazardous volcanic eruptions. “Mount St. Helens was closed to climbing in September 2004, due to risk from explosive eruptions that can cause hazardous conditions on the flanks of the volcano and at the crater rim”

(USFS, Climbing Info/ FAQ's, 2012, para 1). This closure lasted until 2006 when the mountain was deemed safe by federal agency officials (USFS, Climbing Info/ FAQ's, 2012).

Today, the MSHNVM currently advertises many recreation activities such as bicycling, camping, climbing, fishing, hiking, horseback riding, hunting, nature viewing, off highway vehicle riding, picnicking, water activities, and winter sports (USFS, Experience Mount St. Helens, 2012) however, this report will be focusing exclusively on the Mount St. Helens Climbing program and the people who make use of this recreation resource.

In conclusion, based on the increasing use of outdoor resources on and around Mount St. Helens, specifically (G. Walker, personal communication, December, 2012), and the comparable rise in national outdoor recreation participation levels (Bowker et al., 2011; Cordell, Betz, & Green, 2008; Outdoor Foundation, 2012), it seems that increased outdoor recreation participation at this location may create increased impact on the recreation resource. As Manning (2011) states, in terms of recreation effects, one of the main effects may be the ecological degradation of the recreation resource itself. Assessing current knowledge and further instructing visitors how to correctly interact with the nation's wild areas, such as Mount St. Helens, may become a key component in ensuring the future sustainability of these outdoor resources.

### **The Development and Implementation of Minimum Impact Education.**

This section will describe the concept and formation of minimum impact land use ethics. To explore the development of this education-based platform, this section has

been separated into four sections; the need, minimum impact education, Leave No Trace Inc. and finally, social science research and the connection with resource protection.

**The Need.** Overall recreation participation rates have increased since the 1960s, and so have the negative impacts to our nations wild areas (Marion & Reid, 2001). Outdoor recreation continues to play a large role in American culture, with nearly half of the American population recreating outside in 2011 (Bowker et al., 2012). As reported in recent assessments, visitation to public parks and similar areas has remained stable, and in broad terms, the participation in outdoor recreation activities is continuing a long-term upward trend (Cordell, Betz, & Green, 2008). Dunlap and Heffernan (1975) were among the first to categorize outdoor recreation activities as non-consumptive, often called appreciative (e.g. hiking and nature viewing), consumptive (e.g. hunting and fishing), and finally, Jackson (1986) added the category of mechanized (e.g. off road driving, all terrain vehicles). It has been shown in previous research that these three groups have dissimilar reasons for participating in outdoor recreation activities (Manning, 2011), and therefore, this review will be focusing on minimum impact ethics relating to non-consumptive behaviors (appreciative), because mountain climbers have traditionally been categorized as such.

Cole (2004) states, “while often considered to be a non-consumptive use, outdoor recreation inevitably alters the attributes of the environment in which it occurs: soil, vegetation, and water bodies” (p.1). The increased use occurring within the country presents a tricky situation for managers, as it requires the task of correctly protecting these lands from damage so that future generation can also enjoy these resources. This

element of sustainability is mentioned in all of the federal land management organizations' mission statements (USFS, 2012; NPS, 2012; USFWS, 2012; BLM, 2012).

**Minimum impact education.** Declining budgets over the past 30 years is one factor that currently forces land managers to develop and implement strategies that involve fewer actual contacts between rangers, and the general public. Although federal budgets have declined, the use of the federally owned recreation land remains high (Cordell, Betz & Green, 2008). Currently, there is more reliance on the individual outdoor enthusiast to correctly interact with his or her natural surrounding without ranger presence or enforcement. This education-based model began to take shape in the late 1960s through early 1970s, and has developed to become the preferred method of managing for both administrators and recreation users (Manning, 2011). “Information and education programs are designed to persuade visitors to adopt behaviors that are compatible with recreation management objectives, usually to reduce the ecological and experiential impacts of outdoor recreation” (Manning, 2011, p.279).

In 1985, Max Peterson, the former chief of the United States Forest Service stated that, “wilderness management is 80-90 percent education and 10 percent regulation” (Marion & Reid, 2001, p. 1). Manning (2011) adds that many negative impacts are not intentional acts; users of public lands are often unaware of appropriate actions. Furthermore, enforcement of regulations that deal with ecological impacts can be difficult due to the large and remote nature of wild areas (Marion & Reid, 2001). Much of the research, and thus, management attention, has become focused on enhancing information transfer and the continued development of education based programs. The USFS has developed several successful public marketing campaigns, such as Woodsy Owl’s, “Give

a Hoot, Don't Pollute," and Smokey Bear's, "Only You Can Prevent Forest Fires," to remind the public of appropriate actions and assist in reaching desired management outcomes (USFS, Conservation Education, 2012). Similar to these two campaigns, the federal agencies have assisted the LNT message to promote the acceptable outdoor land use ethics (Vaigas & Powell, 2010).

Official minimum impact wilderness techniques have evolved many times since their beginnings in the 1960s. The 1980s brought the first informational brochures and also the Wilderness Information Specialists, (WIS's) (Marion & Reid, 2001). In addition, the 1980s saw the evolution and consolidation of the message into a "No-Trace" campaign (Marion & Reid, 2001). This program enjoyed overall success and soon led to the coordination of the USFS, NPS, and the BLM to produce and distribute the first Leave No Trace Land Ethics pamphlet in the late 1980s (Marion & Reid, 2001). In 1991, the USFS partnered with NOLS, to develop a formal curriculum and an experiential training for land managers (Marion & Reid, 2001).

**Leave No Trace Inc.** The USFS, NPS, BLM and NOLS again came together in 1994 to sign a new Memorandum of Understanding (MOU), and pushed these land use ethics to the forefront of public recreation on federal lands (Marion & Reid, 2001). This was also the same year in which LNT Inc. became a registered 501© (3) not for profit organization and quickly gained prowess with the backing of 24 partners, including government agencies, commercial vendors, and other non-profits (Marion & Reid, 2001). The 1994 MOU also brought about the creation of the original eight Leave No Trace principles that were eventually refined to the seven modern principles of today.

1. Plan Ahead and Prepare
2. Travel and Camp on Durable Surfaces
3. Dispose of Waste Properly
4. Leave What You Find
5. Minimize Campfire Impacts
6. Respect Wildlife
7. Be Considerate of Other Visitors (Leave No Trace, 2012)

Currently, the Leave No Trace Center for Outdoor Ethics is located in Boulder, Colorado, and enjoys success with federal agency assistance and many other corporate and non- corporate partners. LNT practices are the foremost front-country, backcountry, wilderness, and non-motorized recreation land use ethics promoted within the federal land management system (Leave No Trace, 2012).

The current mission of LNT is, "to teach people how to enjoy the outdoors responsibly" (Leave No Trace, About, 2012). Furthermore, one of their specific focuses is to promote, "Leave No Trace practices in close-to-home and day-use areas where 90% of our nation's outdoor recreation occurs" (Leave No Trace, About, 2012).

The Leave No Trace Center for Outdoor Ethics disseminates information through a variety of sources. Currently, there are three types of formal LNT education classes an individual can attend: an Awareness Workshop, a Trainer Course, and a Master Educator Course (Leave No Trace, 2012). These structured courses, in coordination with extensive

literature such as brochures, pamphlets, posters, and signs, encourage the appropriate minimum impact techniques while participating in human powered outdoor adventures (Leave No Trace, 2012).

Today, the four primary federal land management agencies and some state parks have integrated the LNT message (Vaigas, 2009; Leave No Trace, 2012). However, despite the extensive implementation of this program as a visitor education tool, research assessing the programs overall effectiveness remains limited (Vaigas, 2009; Cole, 1998; Marion and Reid, 2001; Miller et al., 2001; Wright, 2000).

Research has been completed over the past few decades in the field of recreation ecology that assists the continued development of the LNT program, (Taff, 2012).

Recreation resource, or recreation ecological impact, has been defined as, “disturbance to natural areas as a result of recreational use” (Hammit & Cole, 1987, p. 6). This field of research primarily investigates the impact of the recreation users on the resource itself. “Conventional wisdom has often held that amount of use is the most important factor influencing amount of impact... research shows such thinking to be oversimplified at best and erroneous at worst” (Hammit & Cole, 1987, p.166). Hammit and Cole (1987) also state,

in any setting the actions of individuals may be considered appropriate, inappropriate, and even illegal, depending on the normative behavior and conditions accepted for the situation and setting. In addition, these actions are determined by many behavioral factors. The motivating force behind one’s actions, the group context within which an action is carried out, and one’s

education and past experience with a particular action all have an influence on whether the action will be conducted in an appropriate or inappropriate manner.

(p. 175)

Hammit and Cole (1987) further note that if managers can understand the factors that determine user behavior they may be able modify any inappropriate behaviors and reduce the impact on the resource.

Recently, the first empirically tested LNT attitude assessment tool named the Backcountry Visitor Ethics Scale Version 1 (BCES-V1) was developed by Vaigas (2009). This tool has been utilized to assess the LNT attitudes of overnight backpackers in two separate NPS areas, and has provided valuable LNT based data to managers and researchers alike. “We envision this scale to be useful to a plethora of potential users, including backcountry managers, academics and graduate students, as well as other land managers managing environments that provide overnight backcountry experiences” (Vaigas, 2009, p. 71).

**Social science research and the connection with resource protection.** Social scientists have studied participants in the recreation and leisure field since the 1930s, but the research grew exponentially in the 1950s and 1960s when increased leisure time became the norm (Manning, 2011).

In 1975 Dunlap and Heffernan developed the term, "environmental concern," and conducted one of the earliest studies examining the link between outdoor recreation and environmental attitudes. They developed three hypotheses to explore this connection.

1. There is a positive association between involvement in outdoor recreation and environmental concern.
2. The association is stronger between appreciative activities and environmental concern than between consumptive activities and environmental concern.
3. There is a stronger association between outdoor recreation and concern with protecting aspects of the environment necessary for pursuing such activities than between outdoor recreation and other environmental issues such as air pollution and water pollution. (Dunlap & Heffernan, 1975, p. 20)

Their results showed that:

1. There appeared to be a weak positive association between outdoor recreation and environmental concern;
2. The association is stronger for appreciative recreation (e.g., hiking and photography) than consumptive behaviors (e.g., hunting and fishing);
3. The association also is stronger when the environmental concern involves the specific resource upon which the favored recreation pursuit depends (as opposed to an overall concern about environmental issues) (Dunlap & Heffernan, 1975, p.23).

Dunlap and Heffernan proposed this link between recreation and environmental concern because they believed that outdoor recreation:

1. Creates an awareness of the environmental problems;

2. Creates a commitment to the protection of valued recreation sites;
3. Cultivates an aesthetic taste for a natural environment and fosters opposition to environmental degradation;
4. Exposes participants to informational and education campaigns that stress the importance of environmental quality.

A follow up study by Van Liere and Noe (1981) found weak positive results in a further examination of the first two hypotheses. They cited that social factors influence how people choose and engage in recreation activities and further, the link may be too complex to understand using the simple 1 to 1 examination between attitude and frequency of participation (Van Liere and Noe, 1981). This study is the first to propose further examination utilizing the construct of recreation specialization, developed by Bryan (1977).

The original Dunlap and Heffernan (1975) study spawned a "flurry" of research on outdoor recreation and environmentalism (Berns & Simpson, 2009, p.82). The research in this field uncovered mixed results during the 1980s through 1990s, and many researchers have requested further research in this area. Tarrant and Green (1998) state that there is certainly a link, but participation alone in a specific outdoor activity does not predict or determine one's behavior in the outdoors. Berns and Simpson (2009) also state, "although there seems to be an association between outdoor recreation and environmentalism, the aspects of the recreation experience that are specifically linked to environmental concern remain unclear" (p.88).

***Psychology as a factor.*** Today, much of the current research relating to a person's environmental attitudes and subsequent behavior is founded around the model presented by Fishbein and Ajzen (1975) and further explored by Ajzen (1991). Fishbein and Ajzen (1975) developed the sequence that beliefs about the environment affect attitudes toward the environment, which affect intentions with respect to the environment; therefore, intentions affect behavior with respect to the environment. In 1991, Ajzen presented the Theory of Planned Behavior, which ultimately furthered this construct. Supported by the work of Ajzen, (1991) and Fishbein and Ajzen (1975), "psychological theory now suggests human behavior is driven by salient attitudes regarding the behavior in question" (Vaigas, 2009, pp. 29-30). Vaigas (2009) also notes that many environmental psychologists have demonstrated the positive relationship between strong environmental attitudes and environmentally conscious behaviors. Thus, research assessments of minimum impacts techniques including LNT have shifted from knowledge based evaluations, to more attitude based evaluations. Education programs have been shown to positively affect attitudes of individuals to those that are more in line with the LNT principles as well as management objectives (Manning, 2011)

***Experience as a factor.*** The concept that experience and expertise in a specific environment has an effect on how people interact with the environment has been another area of interest in the research. Manning (2011) notes that people recreating as a beginner in a given activity often have less knowledge or understanding about the activity or environment; whereas a person with a wealth of experience and expertise is thought to have built up this knowledge overtime. Manning (2011) also suggests, "such differences in knowledge may lead to differences in attitudes, preferences, and behavior" (p. 237).

Since the beginnings of this vein of research, numerous studies have attempted to uncover the experience related variable that explains how and why people act the way they do while participating in recreation activities (Manning, 2011). The concept of recreation specialization was introduced in the late 1970s in hope of shedding light on this subject. To date, there has been a fair amount of research documenting specialization in neighboring recreation activities such as fishing, boating, and birding, however, little research has been completed investigating the connection between recreational specialization and environmental attitudes and even fewer studies exploring recreational specialization and the characteristics of mountaineers.

### **The Concept of Recreation Specialization**

This section will discuss the concept known as recreation specialization. This construct explores the sub groups of individuals participating in the same activity. The purpose of this section is to explore the specialization construct developed by Bryan (1977) and to examine the re-conceptualization performed by Ditton, Loomis, and Choi (1992) that ultimately expanded the original construct. This section is divided into three parts; the original concept, expansion of the specialization concept, and modern specialization studies.

**The original concept.** Kelly (1974,1977) developed a similar concept, and explored the progression of recreation careers over time. This psychological concept was further developed by Bryan (1977) who termed this experience related principle specialization, and defined it as, "a continuum of behavior from the general to the

particular, reflected by equipment and skills used in the sport and activity setting preferences" (p. 175).

Bryan (1977) believed that recreation specialization was a developmental process in which people progressed into the higher stages of involvement over time. Within the framework of recreation specialization, experience has been expanded to specify cognitive, behavioral, and psychological components to further help quantify differences between users and potential differences in attitudes, preferences, and behaviors (Manning, 2011). Since the formation of this construct, researchers have supported the notion that the more specialized individuals provide the non-specialized participants a model for correct behavior (Scott & Shaffer, 2001).

*The formation of the construct.* Bryan's (1977) original research developed four dimensions to help quantify this specialization framework among fishermen. These included: experience in the activity, technique preferences, setting preference, and the relationship of the activity to other areas of life. Based on his research, Bryan (1977) developed four specific categories, or levels of specialization, that appeared to capture this group of recreationalists:

1. *Occasional Fisherman*- those who fish infrequently because they are new to the activity and have not established it as a regular part of their leisure or because it simply has not become a major interest.
2. *Generalists*- fisherman who have established the sport as a regular leisure activity and use a variety of techniques.

3. *Technique Specialist*- anglers who specialize in a particular method, largely to the exclusion of other techniques.
4. *Technique-Setting Specialists*- highly committed anglers who specialize in method and have distinct preferences for specific water types on which to practice the activity. (p. 178)

Based on his results, Bryan (1977) proposed that over time fisherman do tend to progress to higher levels of specialization and as the level of specialization increases, the attitudes of the persons involved tend to change from consumption of the resource toward its preservation. Bryan (1977), also suggested that more specialized anglers appeared to be part of a leisure social world in which there is a shared sense of group identity based on similar attitudes, beliefs and experience. In addition, Bryan (1977) states, “the values attendant to specialization are inextricably linked to the properties of the resource on which the sport is practiced. As the level of angling experience increases, resource dependency increases” (p. 186).

Bryan (1977) concluded that each level of specialization had specific preferences that ultimately defined each group, and that understanding these preferences could aid land managers in meeting these groups needs.

***The 1979 construct expansion.*** In 1979, Bryan expanded the specialization framework to include photography, hiking, backpacking, mountain climbing, skiing, canoeing, bird watching and hunting. "Bryan's goal was to provide natural resource managers and researchers a conceptual framework for understanding and investigating diversity among outdoor recreationists engaged in the same activity” (Scott & Shafer, 2001, p 319).

As noted, Bryan (1979) specifically examines mountaineering and those who participate in this type of recreation. Similar to the 1977 study, Bryan develops a continuum of specialization within this sport.

Beginning climbers may take their first climbs by means of guided tours. After a few lessons on technique, they are prepared for short and relatively moderate climbs. Some are content to remain at the novice level, satisfied that they need to go no further to get exercise and outdoor experience. (Bryan, 1979, p.70)

Bryan (1979) continues, “more regular enthusiasts enjoy the status of being a climber, as well as the experience of climbing moderate peaks and its aesthetic rewards” (p. 70). Bryan names these climbers the New American Super Climber. He notes, “the goal seems to be to get up the hardest cliff fast using the latest lightweight gear” (Bryan, 1979, p.70). In between this New American Super Climber and the top level is what Bryan (1979) refers to as the new approach to “Himalayan class” mountaineers. These Himalayan class climbers “make extremely difficult ascents with a minimum of equipment” (Bryan, 1979, pp. 70-71). The final level of mountaineering that Bryan (1979) discusses is that of the “free climber.”

There is increasing emphasis by such climbers to do mountain climbing “clean”. Specialized removable equipment is employed. This is considered as a “purist” form of the sport, with increasing numbers of established climbers turning to it... indeed, at the upper levels of specialization the sport seems less goal oriented in terms of climbing the highest or most difficult peaks. The aesthetics of the experience become paramount. (Bryan, 1979, p.70)

Bryan (1979) suggests that modern climbers range in specialization starting at novice, with the new American super climber and Himalayan-class in the middle, and finally, the free climbers at the top of the specialization continuum. However, he does note that novice climbers can ultimately reach the free climber level without going through the Himalayan-class climber stage.

Bryan (1979) found that beginners in an outdoor activity simply want results, newcomers want to “make it to the top” (p. 87). Further along the continuum is the generalist. These individuals have a more accomplished background and more experience in the sport. These people are noted by Bryan (1979) as participants who are the most vulnerable to become involved in additional types of specialization. These “gadget manipulators,” as defined by Bryan (1979), often become heavily involved in the equipment aspects of the sport (p.88).

Finally, the furthest ends of the specialization continuum are the individuals who place the most emphasis on doing the activity for its own sake, those who are heard most frequently to refer to the “quality” of the experience and those who make the most specific demands for particular resource settings. (Bryan, 1979, p. 88)

In conclusion Bryan (1979) states,

The seriousness of failure to recognize that every sportsmen category is comprised of distinct subgroups with quite different orientation, interests, and expectations for the outdoor experience cannot be overstated. (p. 93)

For the specialization construct as a whole, Bryan (1979) reports, “an expectation would be that the number of individuals participating at various levels of specialization is skewed toward the low end of the continuum” (p. 91). Since Bryan's (1979) mountaineering framework, the sport has changed in several ways. This will be explored in a section that follows.

**Expansion of the specialization concept.** Ditton et al. (1992) expanded on Bryan's (1977) construct by incorporating Unruh's (1979) social worlds construct. Social worlds according to Unruh (1979) are larger than groups or organizations and are not defined by boundaries, memberships, or territory. "A social world must be seen as an internally recognizable constellation of actors, organizations, events and practices which have coalesced into a perceived sphere of interest and involvement for participants" (Unruh, 1979, p. 115). Unruh's (1979) social worlds theory was further broken down and participants were characterized as belonging to one of four subworlds consisting of strangers, tourists, regulars, and insiders. Manning (2011) also notes that social worlds include groups of people who share a common specialization level. These people, "help define the meanings, preferences, and norms of behaviors that are associated with such levels of specialization" (Manning, 2011, pp. 248-249). The combination of Bryan's (1977) specialization construct with Unruh's (1979) social worlds concept provided Ditton et al. (1992) eight hypotheses to further examine and validate this construct:

1. Persons participating in a given recreation activity are likely to become more specialized over time.

2. As level of specialization in a given recreation activity increases, the value of side bets will likely increase (cost of obtaining and learning to use equipment and emotional cost of developing and maintaining social relationships).
3. As level of specialization in a given recreation activity increases, the centrality of that activity in a person's life will likely increase.
4. As level of specialization in a given recreation activity increases, acceptance and support for the rules, norms, and procedures associated with the activity will likely increase.
5. As level of specialization in a given recreation activity increases, the importance attached to equipment and the skillful use of that equipment will likely increase.
6. As level of specialization in a given recreation activity increases, the dependency on a specific resource will likely increase.
7. As level of specialization in a given recreation activity increases, level of mediated interaction relative to that activity will likely increase.
8. As level of specialization in a given recreation activity increases, the importance of activity specific elements of the experience will decrease relative to non activity-specific elements of the experience. (pp. 39-41)

Ditton et al. (1992) tested these hypotheses on anglers and reported results that are congruent with Bryan (1977). Based on their results, Ditton et al. (1992) believed this research showed strong support for the re-conceptualization of the specialization concept.

The specialization concept has had its fair share of criticism. Manning (2011) warns that studies must be cautious and avoid measuring variables that are repetitive and

then said to influence each other. Additionally, there has been discrepancy in the way specialization has been measured (Manning, 2011) and finally, "the concept of recreation specialization should not be interpreted and applied too literally. Recreationists may adopt a variety of recreation behaviors depending upon circumstances" (Manning, 2011, p. 254). Scott and Shaffer (2001) also note that the progression, assumed by researchers, that take place within an activity is not straight forward and that additional research is needed to understand the true factors that facilitate this development.

Researchers have taken the above cautions into consideration and have continued to utilize this construct. Recreation specialization has been found to be related to many variables of interest to this study, specifically attitudes, and environmentally responsible behaviors (Manning, 2011).

One tool that has been developed to assess the differing levels of specialization contained within a specific group is the Recreational Specialization Index (RSI). Salz, Loomis, and Finn (2001) developed the RSI based on the previous social worlds theory explored by Unruh (1979) and the Ditton et al., (1992) reconceptualization of the specialization construct.

In developing our specialization index, we chose to pursue an a priori approach that builds on theory, and that uses theory to generate the index items. Our specialization index items, therefore, were derived from the four characteristics (orientation, experiences, relationships, and commitment) used by Unruh (1979) to place participants in a particular subworld (or in our case a particular specialization level)" (Salz, et al. 2001, p. 244).

Their results provided strong support for the Ditton et al. reconceptualization and validated the newly developed RSI as an effective tool in assessing specialization within recreationalists (Salz, et al. 2001).

This tool was further tested by Salz and Loomis, (2005) and in 2009, Hawkins, Loomis and Finn, replicated the validity and reliability of the RSI by applying the tool to a variety of recreational activities. Their results also supported the use of the RSI.

We conclude that the Salz et al. recreation specialization index continues to be an internally valid and reliable measure of the construct. In addition, because the index has now been shown to measure aspects of recreation specialization across different user population in different areas, it appears to exhibit a form of external validity” (Hawkins, et al., 2009, p. 298).

The RSI has shown to be an efficient and effective tool in distinguishing differing specialization levels contained within a recreation population. Hawkins, et al. (2009) noted that this tool has only been utilized in a limited capacity thus far in research, potentially due to an unawareness of its existence, or concerns about validity. However, the authors have shown the tool to be both valid and reliable and furthermore, use of this tool has been encouraged.

**Modern recreation specialization studies.** Recreation specialization has been an area of study for several decades. Thapa (2003) states, "the similarities and differences in environmental attitudes and behaviors within an activity may be dependent upon levels of commitment or specialization in the activity...These relationships need to be further

explored empirically for a broader range of outdoor recreational pursuits" (p. 99). In addition, Berns and Simpson, (2009) affirm, "a goal of any new research on this topic should be to build on the efforts of previous research and continue to flesh out the association between outdoor activities and pro-environmental attitudes" (p. 88).

A small number of studies have investigated the connection between environmental attitudes and specialization among various outdoor enthusiasts, (Katz, 1981; Kauffman, 1984; Kuentzel & Heberlein, 1992; Wellman & Roggenbuck, 1992; Mowen, Williams & Graefe, 1997; Thapa, 2000; and Dyck, Schneider, Thompson & Virden, 2003). Kauffman (1984) presented that more specialized canoeists showed more environmental concern. Similarly, Mowen, Williams, and Graefe (1997) reported that specialization level is a better predictive tool, in relation to environmental attitudes, than other traditional measures.

The Dyck et al. (2003) study examined a group of mountaineers called the Mazamas, located in Oregon. The preface of this research was to examine the relationships between the specialization of the climber, overall environmental attitudes, and attitudes specific toward low-impact practices. Dyck et al., (2003) divided the respondents into three specialization sub-groups low, medium, and high as suggested by previous studies (Graefe et al., 1985; Kauffman & Graefe, 1984; Graefe, 1981). Their results (N=270), showed that, "attitudes toward low-impact practices significantly differed among specialization levels" and "contrary to what managers might expect for such a technically competent group, mountaineers' attitudes toward low impact vary" (Dyck, et al., 2003, p. 44). The researchers concluded that, "...planning and education efforts for mountaineers can be tailored toward specialization level, resulting in more

effective education programs as well as continued resource protection..." (Dyck, et al. 2003, p. 44).

This study does offer good insight into the differences between specialization levels among this population; however, one drawback to this study is that the Mazamas are, themselves, a specialized group of individuals. This mountaineering club requires certain alpine accomplishments before one can join this group, and this club collects annual membership fees ([www.mazamas.org](http://www.mazamas.org), 2012). This group shows an increased level of commitment to the sport of mountaineering by joining this club, thus potentially moving themselves higher on Bryan's (1977) specialization continuum. This organization offers a variety of mountain based adventures for all experience, or specialization levels, however, not all people who climb mountains are members of an official mountaineering club.

Additional research assessing the construct of specialization and its relationship to mountaineers has not been found at this time in the literature. This proposed study will assess a true sample of mountaineers, in the hope of providing an addition to the literature exploring differing levels of specialization within this group, and the relationship to Leave No Trace understanding. The next section will explore research that has occurred within the sport of mountaineering and how it relates to the Bryan (1979) assessment.

### **An examination of Mountain Climbers.**

This section will explore themes in research that have been examined since the early 1980s. This section is separated into three sections; the classification of

mountaineers, the Mount St. Helens climbing program, and research on the Mount St. Helens climbers.

**The classification of mountaineers.** Since Bryan's (1979) study, the sport of mountaineering has changed in several ways. "Numerous factors have facilitated an increase in people doing mountaineering, including gear improvement, high-tech support systems, improved tourist infrastructure, easier accessibility and diminished risk levels" (Pomfret, 2010, p. 2).

The 1980s brought about the concepts of adventure recreation and risk recreation. Ewert (1985) defines risk recreation as, "leisure activities exposing the participant to real or perceived physical danger usually in an outdoor natural setting" (p. 241). Mountaineering was considered a typical example of this classification, and Ewert (1985) further suggested that experienced climbers and novice climbers appear to participate in mountaineering for distinctly separate reasons.

The findings suggested that the greater the experience level the greater the tendency to adhere to more intrinsically related motivation such as challenge, personal testing, and locus of control. Similarly, the inexperienced climber was motivated by factors such as recognition and socializing. (Ewert, 1985, p. 241)

Ewert's (1985) results appear to support to the progression that Bryan's (1977) specialization continuum proposes. In a later study, Ewert (1994) found that, "as climbers grow in experience, they appear to move along a continuum of motivating factors from items relatively mechanical (e.g., learning how to climb) to those items that had greater

intrinsic and autotelic meaning (exhilaration and self-expression)" (p. 15). It appears that Ewert (1994) was utilizing the same framework that Bryan (1977) had earlier proposed.

The late 1990s and 2000s have brought about the transformation from adventure recreation to adventure tourism (Pomfret, 2006). Hill (1995) states, "old fashioned outdoor recreation has evolved into adventure travel, ecotourism and nature-based tourism. Spending time in a natural setting to learn about the environment is not a new concept. But the names given to such experiences have changed dramatically..." (p.57). Hill (1995) also distinguishes between two types of outdoor adventures, "hard, " and, "soft" (p. 59). "Hard adventure: Refers to activities with high levels of risk, requiring intense commitment and advanced skill" (Hill, 1995, p. 63). Additionally, "Soft adventure: Refers to activities with a perceived risk but low levels of real risk, requiring minimal commitment and beginning skills" (Hill, 1995, p. 63). Most mountaineering activities would be considered "hard" however, there are some elements that would also be considered "soft" according to Hill (1995). Hill (1995) concludes that sustainable practices will become a major issue for this field of recreation activities. "Closely tied to all nature-based tourism is a need for the development of individual environmental ethics" (Hill, 1995, p. 60).

As previously stated, the participation in outdoor recreation activities such as mountain based activities is on the rise (Bowker et al. 2011; Cordell, 2012; Outdoor Foundation, 2012). Additionally, the enrolment in the regional mountaineering group is increasing and the total number of individuals climbing Mount St. Helens is rising. (D. Wilson, personal communication, 2013; G. Walker, personal communication, 2012). Researchers have warned about the negative impacts associated with increasing use on

recreation areas and Vaigas (2009) said it well by stating, “The equation is simplistic yet indubitable: Increased Use + Lack of Compliance with Recommended Practices =Degradation of the Resource” (p. 2).

Gaining knowledge of what the users of this mountain know about minimizing his or her ecological impact will be an important step for managers in correctly determining these users educational needs. In an effort to understand more about the climbers of this mountain, we will first examine the mountain itself. The next section will explore the history of the Mount St. Helens climbing program and explore current management strategies in place.

**The Mount St. Helens climbing program.** The first recorded summit of Mount St. Helens occurred in 1853 by a group of men from Portland, OR (Williams, 1988). Since then, thousands have scaled the mountain using one of the various routes. “An ascent to the summit of Mount St. Helens via the Monitor Ridge (or any other route) is not a hike- it’s a long, grueling climb over uneven, rough lava surfaces, loose rock and ash and steep snow” (Vielbig, 1997, p.137). "Mount St. Helens is a popular climb for both beginning and experienced mountaineers. Although people are able to climb Mount St. Helens year-round, late spring through early fall is the most popular season" (USFS, Climb Mount. St. Helens, 2012, para.1).

After the 1980 eruptive period, officials deemed the mountain safe in 1987 and the Mount St. Helens Climbing Program was developed. To help protect ecological resources located within the climbing area, and to help ensure the high-quality experience desired, managers who developed this recreation resource placed a use limit of 100 persons per day using any of the various routes (CMP, 1985).

The Monitor Ridge route is the primary route used during the busy months (USFS, Climb Mount. St. Helens, 2012). "Although strenuous, this non-technical climb is suitable for people in good physical condition who are comfortable scrambling on steep, rugged terrain" (USFS, Climb Mount. St. Helens, 2012, para.1). The Climbers' Bivouac and Ptarmigan Trailhead Design Narrative (1987) specified that 85% of the climbers registered to climb were expected to use this route during the main climbing season, May 1 through October 31. "Newcomers are highly likely to use this route rather than take the time to investigate the area for an unadvertised route" (USFS, Climbers' Bivouac Design Narrative, 1987, p. 3).

An additional climbing route was developed, originating out of the Marble Mountain Sno-Park, named the Worm Flows climbing route. "The Worm Flows Climbing Route, from Marble Mountain Snow-Park, is the most direct route to the summit of Mount St. Helens during the winter season" (USFS, The Worm Flows, Winter Climbing Route, 2012). This route provides access for the winter season climbers who typically use snowshoes or backcountry skis and snowboards to climb (USFS, Climbing Info/ FAQ's, 2012). During the dry summer months, typically July through September, both routes are considered non-technical and can be classified as either "soft" (Hill, 1995) and Class I, hiking, or Class II, simple scrambling, with possible occasional use of the hands (Cox & Fulsas, 2003). During this time period, all climbers are on foot and the routes are marked and maintained by USFS rangers ( USFS, Mount St. Helens Climbing, 2012).

Conversely, during the typical snow covered months (November- June), many judgment-based decisions must be made and additional equipment is needed to travel

safely in this environment (USFS, Climb Mount St. Helens, 2012; Cox & Fulsaas, 2003). According to Hill (1995), this now qualifies as a "hard" adventure, requiring additional equipment and skill. "Snow travel is trickier than trail hiking or rock climbing. A rock face is essentially unchanging, whereas the snowpack undergoes rapid changes...Safe snow travel requires judgment based on experience" (Cox & Fulsaas, 2003, p. 307). Climbers during these months utilized a variety of techniques and climbing routes to summit the mountain. In addition, many modes of travel are used to climb including, backcountry skis, backcountry snowboards, snowmobiles, snowshoes, and on foot (G. Walker, personal communication, September, 2012).

*The 2007 climbing program re-structure.* While the mountain was closed, from 2004-2006, the structure of the program and the permit system was re-vamped and the current model of the Mount St. Helens climbing program was introduced in 2007 (USFS, Climbing Info/ FAQ's, 2012). During the closure, a new non-profit organization was created with the primary goal to help educate visitors about the Mount St. Helens area.

The Mount St. Helens Institute (MSHI) was founded in 2006 with the mission to "promote stewardship, science and appreciation of volcanic landscapes of Mount St. Helens and the Pacific Northwest" (Mount St. Helens Institute, About Us, 2012). This organization is authorized under a special use permit to conduct guided climbing trips, lectures, field seminars, outings, and coordinate volunteer events (Mount St. Helens Institute, About Us, 2012). Currently, the Mount St. Helens climbing program operates year round with one to five USFS climbing rangers and the MSHI contributes several full time staff and approximately ten volunteers (G. Walker, personal communication, November, 2012).

According to the USFS Mount St. Helens Climbing program website, the climbing permit system is now divided into two seasons. The main climbing season is established as from April 1st until October 31st, and the winter climbing season is designated as November 1st until March 31st. During the winter months a climbing permit is free of cost and climbers obtain one at the trailhead. During the main season, April-October, all climbers must purchase a climbing permit using an internet based resource before they are allowed to access the mountain (USFS, Climb Mount. St. Helens, 2012). The MSHI in conjunction with the USFS manage the website where climbers are able to purchase up to twelve \$22.00 climbing permits. The main season is also separated into two sections. From April 1<sup>st</sup> until May 14<sup>th</sup> there is no limit on the number of climbers who can be on the mountain because of snow coverage, however, advanced registration is required using the website (USFS, Mount St. Helens Climbing Permit System, 2012). From May 16<sup>th</sup> until October 31<sup>st</sup> the permits are limited to 100 per day. "Access is limited to protect the volcano's physical and biological features and processes, and to reduce crowding" (USFS, Mount St. Helens Climbing Permit System, 2012, para 2). Current figures for the routes show over 15,000 permits were sold for the 2012 main climbing season (G Walker, personal communication, September, 2012).

The Climbers Bivouac trailhead and the Marble Mountain Sno-Park are still where the majority of the people who climb Mount St. Helens access this resource. Approximately one third of the climbers use the Marble Mountain route, while about two thirds of the people use the Climbers Bivouac route (G. Walker, personal communication, September, 2012). The reality that so many people use these designated routes may be intensifying the damage to this resource. Ward (2005) notes that Alaska's Mt. McKinley

has a concentration of climbers on one main route and this has shown to be a main factor causing "evident degradation" of the resource (p.37).

Both climbing routes offer primitive camping at their respective trailheads (USFS, Mount St. Helens Climbing Permit System, 2012). It is currently unknown how many of the climbers utilize these camping areas prior or post climb, but they are continuously occupied during the main climbing season and especially on weekends (G. Walker, personal communication, 2012).

*Research on the climbers of Mount St Helens.* Ewert (1990) was the first and appears to be the only researcher to study this population of recreation users. Ewert (1990) found that, "chief among the reasons for climbing Mount St. Helens was a desire to see the volcano and observe the natural volcanic processes" (p. 180). Also, these climbers showed that litter, human waste, and trampled vegetation were not detrimental to their overall experience (Ewert, 1990). Ewert (1990) additionally stated that this attractive geologic feature has the potential to become a destination with extremely heavy use, especially on the upper portion of the mountain that historically has seen very little resource damage. In conclusion Ewert (1990) states, "long-term research has yet to determine whether the 100-climber allocation is an appropriate impact from an ecological perspective" (p. 183).

It appears that Ewert's (1990) prediction may be taking place. The participation numbers are increasing on this mountain, yet it remains unclear if, or how much, these recreation users understand about the correct Leave No Trace actions requested of them. Ewert (1990) claims that, "Mount St. Helens now has a visitor and sightseer rather than a

mountaineer,” (p. 182). It is currently unknown if this labeling is correct and if so, it is unknown what this population knows about limiting their ecological impact.

Understanding who these users are, and exploring their relationship with LNT will provide managers a framework for future resource protection actions.

## **Summary**

It has been documented that outdoor recreation participation is on the rise in the United States (Bowker et al., 2011; Cordell, Betz, and Green, 2008; Outdoor Foundation, 2012 ). It has also been shown that outdoor recreation activities such as mountain climbing are popular within the United States (Bowker et al. 2011; Outdoor Foundation, 2012). Additionally, mountain climbing and sports associated with the mountain environment are predicted to increase in participation for the foreseeable future (Cordell, 2012). These simple truths, combined with the knowledge that even appreciative outdoor recreation activities such as hiking and mountaineering inevitably causes damage to the environment (Cole, 2004). This requires that management agencies such as the USFS need to continue to explore the true relationship between the users and the recreation resource.

As long as the Federal Agencies continue to support and utilize the Leave No Trace land use ethics as a primary tool for achieving resource protection goals, research should continue be conducted assessing the understanding by the users, and effectiveness of Leave No Trace educational efforts. The BCVES-V1 assessment tool was recently developed to aid researchers, and managers alike, to better understand the LNT attitudes of visitors (Vaigas, 2009). This tool, used in combination with other variables such as

recreational specialization, (Bryan, 1977) may ultimately give managers a clearer picture of the individuals who are accessing the resources.

The construct of recreational specialization was created by Bryan (1977) with the purpose to help land managers better understand the diversity of users participating in the same recreational pursuit, in hope of better meeting their specific needs (Bryan, 1977; Scott & Shaffer, 2001). These needs should not be limited to specific preferences or desires of the recreation users themselves. These needs may be things such as information and education inequalities between specialization levels that managers should address through various avenues including literature, signage, and forest rangers to ensure the sustainability of the resource in use. The RSI assessment tool developed by Salz, Loomis, and Finn (2001) and further validated by Hawkins, et al., (2009) has been shown to accurately determine a person's recreational specialization level based on the differences found in the four determining factors, orientation, experience, relationship, and commitment. The ability to identify separate specialization sub-groups could ultimately help managers differentiate specific needs contained within the larger mountaineering population at hand.

Providing the appropriate Leave No Trace message and information has been shown to influence attitudes to those more congruent with managers of recreation areas (Taff, 2012, Manning, 2011). Dyck et al. (2003) has also suggested that tailoring educational messages toward the differing levels of specialization within the mountaineering community may be an effective way to address resource protection. The BCVES-V1, designed by Vaigas (2009), has shown the ability to accurately assess an individual's attitudes regarding LNT, however, further research is needed to better

understand the relationship between specialization and Leave No Trace understanding within the mountaineering environment. This study will begin to address that need.

The next chapter will explore in depth both the BCVES-V1 and the RSI. In addition, the planned research methods, protocols, and considerations will be presented.

## **Chapter III**

### **Methods**

The purpose of this study was to examine the relationship between recreational specialization and the understanding of Leave No Trace land use ethics among the mountain climbers of Mount. St. Helens. This study was designed to examine this relationship among climbers over the main climbing season of 2013, April through October. Three hypotheses were developed for this study: (1) there will be a significant difference between the attitudes regarding the Leave No Trace principles of higher specialized climbers and lower specialized climbers; (2), the Leave No Trace attitudes of higher specialized climbers will be significantly more congruent with the ideals of the 7 Leave No Trace principles than the lower specialized climbers; and (3), there will be a significant difference in mean specialization level over the duration of the Mount St. Helens climbing season.

To gain access to the climbers, the USFS and the MSHI were contacted, and agreed to administer this survey to the registered mountain climbers for the 2013 Mount St. Helens climbing season. An online survey questionnaire was created that was designed to assess the climber's level of mountaineering specialization, attitudes relating to the LNT principles, and general demographic information. This methodology chapter consists of four sections that will outline the actions and considerations involved in this study: participants, instrumentation, procedures, and analysis.

## **Participants**

The participants of this study consisted of persons who had registered to climb Mount St. Helens during the main climbing season of 2013 before May 14<sup>th</sup> 2013. Each year, all climbers from April 1 to October 31, must purchase a permit using the online tool provided by the MSHI. Only climbers who have registered before May 14<sup>th</sup> were contacted.

## **Instrumentation**

Three instruments were combined to create this survey. These instruments included assessments designed to measure the level of recreational specialization, a tool to measure the climber's LNT attitudes, and a demographic section.

**Recreational Specialization Index (RSI).** The participant's level of recreational specialization was measured with the RSI. The RSI was developed by Salz et al., (2001), was further tested by Salz and Loomis (2005), and ultimately re-validated by Hawkins et al. (2009). The RSI was designed to locate where respondents exist on Bryan's (1977) continuum of specialization and contains four subscales. The four subscales examine participation, experience, relationships, and commitment and are designed to assess the connection the participant has with the given recreation activity. Each of the four subscale items are measured using a four-point Likert scale design with answers ranging from (1) low specialization to (4) high specialization. The least specialized individuals theoretically answered with scores of  $1+1+1+1=4$ , and the most highly specialized individuals theoretically answered  $4+4+4+4=16$ , thus individuals will be placed on

opposite ends of Bryan's (1977) specialization continuum. A full copy of the RSI instrument can be found in Appendix A.

**Backcountry Visitor Ethics Scale Version 1 (BCVES-V1).** The purpose of the BCVES-V1 is to measure the level of understanding regarding appropriate LNT land use ethics and techniques by assessing attitudinal based measures. Past research has focused on knowledge as an outcome, and this has shown to be ineffective (Vaigas, 2009). Vaigas (2009) states there are two major concerns with this style of research. First, "such tools utilized a dichotomous answer format (right or wrong) and thus solicit minimal amount of variability. The second concern is the recognition that human behavior is determined more by attitudes than knowledge, particularly in environmental contexts" (Vaigas, 2009, p. 44). This study will utilize a modified BCVES-V1 to attain appropriate data for this recreation environment.

The BCVES-V1 was developed by Vaigas (2009) because, "it became clear that a multi-item scale to assess attitudes regarding various LNT oriented behaviors did not exist" (p. 37). The formation of this tool came about by using the 7 LNT principles, "as a conceptual framework to help guide key aspects of the investigation including defining constructs, item generation and refinement" (Vaigas, 2009, p. 37). The resulting tool became,

a psychometrically sound measure of backcountry visitors' attitudes regarding promoted LNT practices and is a substantive inroad into the assessment of attitudes regarding common backcountry practices. We envision this scale to be useful to a plethora of potential users, including backcountry managers,

academics and graduate students, as well as other land managers managing environments that provide overnight backcountry experiences. (Vaigas, 2009, p. 71).

The BCVES-V1 assesses user attitudes by using Likert scale style questions based on the appropriateness of an activity or action anchored from 1= very inappropriate, 4 = neutral, and 7 = very appropriate. The questions contained within the BCVES-V1 assess LNT attitudes specific to general outdoor activities and dispersed camping in a backcountry area. The modified BCVES-V1 used in this research has eliminated questions from the original BCVES-V1 that are irrelevant to the mountaineering environment. In addition, three questions were formed that address LNT related questions under investigation, specifically the LNT principle #1, Plan Ahead and Prepare.

The original BCVES-V1 did not include the LNT principle #1, Plan Ahead and Prepare, because this principle, "addresses behaviors that occur prior to an individual engaging in outdoor recreation activities. This principle, while an integral part of any backcountry experience, does not deal directly with the recreation practices in backcountry per se" (Vaigas, 2009, p. 38). However, this principle is specifically addressed as a LNT principle that is important within mountaineering environment (Leave No Trace, 2013). The statement, "carry and know how to use a map, compass..."(Leave No Trace, Alpine Mountaineering Principles, 2013, para 1.) is specifically addressed on the Leave No Trace's mountaineering principles website, and thus has been included in this modified version of the BCVES-V1.

For the purpose of this study, each of the seven LNT principles were addressed to gain a wholistic image of the climber. The seven LNT principles are as follows:

1. Plan Ahead and Prepare
2. Travel and Camp on Durable Surfaces
3. Dispose of Waste Properly
4. Leave What You Find
5. Minimize Campfire Impacts
6. Respect Wildlife
7. Be Considerate of Other Visitors (Leave No Trace, 2012).

For example, one question included in this research reads, "walk around muddy spots on the trail," this action is described as "very inappropriate" by the LNT ethics, however, many people do walk around such spots, thus creating multiple trails and ultimately more ecological damage. An example of a question that will be removed from the BCVES-V1 because it is not applicable to this study is, "using soap in streams as long as there are currents to dilute the suds." Due to the fact that no streams exist on the climbing routes of Mount St. Helens, this question has been removed.

The seven LNT principles are assessed using 21 questions in the modified BCVES-V1. The 21 questions are divided into 4 sub-scales to measure attitudes relating to an overall LNT attitude, a general backcountry attitude, a campfire attitude, and a

dispose of waste attitude. The full copy of the modified BCVES-V1 tool is provided in Appendix A.

**Demographic Questionnaire.** Questions in relation to age, gender, month of climb, and equipment used have been asked to explore any demographic based trends. Additional questions to identify affiliation with organized mountaineering groups, previous LNT training, and the participant's role while on climbing Mount St. Helens have been asked. The ability to analyze demographic differences will enable managers to selectively target certain populations with pertinent information if any differences are presented. These demographic questions allowed for higher powered statistical tests to be used relating to recreational specialization levels, and attitudes relating to LNT use. Upon agreement to administer the survey, the MSHI requested two questions be added to the demographic section. One question assessed the participants' satisfaction with the Mount St. Helens climbing permit process, and the second asks the participant to identify the most frustrating part of the current permit process. The full copy of the demographic questions used is provided in Appendix B.

## **Procedures**

Before contact was made with participants, ethical clearance was obtained from the EWU Internal Review Board, and written permission from the MSHI director was also attained. The MSHI manages the online database where people register to climb the mountain prior to arriving at the trailhead. The MSHI agreed to disperse this survey via email to the participants on behalf of the researcher through their online vendor, Kinsail.com. The database, managed by the MSHI, contains email address information

for all climbers who have registered for the 2013 climbing season. These registered climbers are allowed to purchase one to twelve total climbing permits, and permits are to be used by themselves and the other members of their respective climbing parties. In total, approximately 15,000 climbing permits were purchased by 8,000 registered climbers for the 2012 climbing season, and it is assumed that the 2013 figures will be similar.

The participants for this study were conveniently sampled. Henderson and Bialeschki (2010) define convenience sampling as, “sampling that happens to be available” (p. 128). For this study, the population of climbers was easily contacted, thus convenient. Further, Henderson and Bialeschki (2010) support this style because researchers have a captive audience, and if done properly, this technique can be representative. In addition, Miller (2011) states that the acceptability of non-random sampling to represent the true population is growing. The participants in this study were contacted through email. Online surveys have seen an increase in use since the 1990s (Dillman, Smyth, and Christian, 2009) due to the increase of computer access and comfort.

The participants received a scripted email developed by the researcher on behalf of the MSHI. This email explained the study, and provided the appropriate hyperlink to access the online assessment a full copy of this letter is attached in Appendix B. This online method allowed for both convenience and anonymity of the participants. A major benefit of this style is the ability to assess a large amount of participants in a relatively easy manner, however, one of the cited drawbacks has been low response rate (Dillman, et al., 2009). Until May 14<sup>th</sup> the total sample number was unknown. On May 14<sup>th</sup>, it was

determined that 4,337 participants would be contacted. According to Dillman et al. (2009), to achieve a representative sample for the estimated climbing population of approximately 4,300, information from at least 350 individuals should be gained. For this study, the purpose of contacting the total available population is to increase the overall representativeness of the survey for this population.

Utilizing the survey capabilities of GoogleDocs, the RSI, the modified BCVES-V1, and the demographic questionnaire were uploaded and made accessible to participants. The survey was made available to complete for one week, May 14<sup>th</sup> to May 21<sup>st</sup> 2013. This one week window was originally scheduled to be longer, however, the researcher received an email suggesting the survey link had been forwarded to a climber who was not a part of the target population, thus the survey was closed in order to eliminate any further invalid data entries. According to Dillman, et al., (2009) a response rate of under 25% creates significant risk of non-response error. If the response rate after the initial email was unacceptable, a reminder email was designed to be sent two weeks after the initial email, requesting participation in the study if the climbers had not already done so. This follow up email was ultimately not used. A complete copy of the scripted email and follow-up email can be found in Appendix B.

## **Analysis**

The data from this study was analyzed in an entirely quantitative manner. Data from the participants was analyzed using IBM SPSS version 20. Using descriptive statistics, the data was screened for any inconsistencies, and checked for normality. The internal consistency of the RSI and the 4 sub-scales contained in the BCVES-V1 were

calculated using Cronbach's alpha (Cronbach, 1951). In addition, the Analysis of Variance (ANOVA) technique was used to explore any significant differences between recreational specialization, LNT Attitudes and the dependent variables of interest.

### **Summary**

The purpose of this study was to examine the relationship between recreational specialization, and the attitudes of Leave No Trace land use ethics among the mountain climbers of Mount. St. Helens. By tracking this relationship over the entirety of the climbing season, managers will gain insight into the categories and knowledge levels of the participants who are accessing this resource. The need to infer results from a sampled population has been reduced by attempting to capture the entire population of registered climbers as participants in the study. The data gained provides an addition to the small amount of research pertaining to recreational specialization and its relationship to the seven LNT principles. Furthermore, this data will provide insight into the mountaineering population's understanding of the LNT principles. And finally, managers of this resource will have valuable information about the users of this resource throughout the registered climbing season, and documentation of any educational needs these users may require.

## **Chapter IV**

### **Results**

The purpose of this study was to examine the relationship between recreational specialization and the understanding of Leave No Trace land use ethics among the mountain climbers of Mount. St. Helens. This study was designed to examine this relationship among climbers over the main climbing season of 2013, April through October. This chapter will provide results to the three hypotheses that were developed for this study: (1) there will be a significant difference between the attitudes regarding the Leave No Trace principles of higher specialized climbers and lower specialized climbers; (2), there will be a significant difference regarding the comprehension of the Leave No Trace principles between members of organized mountaineering groups and non-members; and (3), there will be a significant difference in mean specialization level over the duration of the Mount St. Helens climbing season. Results will be presented in the following order: Descriptive statistics and Cronbach's alpha results, analysis of variance (ANOVA) results, and exploratory variables results.

#### **Descriptive Statistics**

On May 14<sup>th</sup>, 2013 a total of 4,337 emails were sent to people who had purchased climbing permits for the 2013 Mount St. Helens climbing season and were asked to participate in this study using the survey instrument. This was the total number of persons who had purchased climbing permits on or before May 14<sup>th</sup>, 2013. One week after initial contact, the data from the participants was downloaded from Google docs and imported into SPSS version 20. A total of 1174 responses were assessed, with one response considered invalid. The total sample size analyzed was n=1173. This provided

an overall response rate of 27.1%. Participants ranged in age from 18 to 74, with a mean age of 40.65 and a mode of 33. Within the population of climbers who responded to the survey, several descriptive patterns emerged (see Table 1). The majority of respondents were male (65%), with 18.4% of the total respondents indicating that they belonged to an organized mountaineering or outdoor organization. In addition, only 17% of respondents indicated they had previously participated in any type of Leave No Trace training or been exposed to formal information based courses. Climbers from each month of the 2013 online registration climbing season responded to the study (see Table 1).

Based on recommendations from previous research, (Dyck et al., 2003; Graefe et al., 1985; Kauffman & Graefe, 1984; Graefe & Kauffman, 1987; Graefe, 1981) the participant's RSI scores were divided into thirds, producing low, medium, and high mountaineering specialization groups. Participants with a mean RSI score of 2.5 or below were labeled low specialization climbers (n=390), mean RSI scores between 2.51 and 3.0 were labeled medium specialization climbers (n=591), and mean RSI scores of 3.01 to 4.0 were labeled high specialization climbers (n=192).

**Table 1.**

Demographics (n = 1173)

<b>Gender</b>	<b><i>f</i></b>	<b><i>%</i></b>
Males	764	65.1
Females	409	34.9
<hr/>		
<b>Affiliated with mountaineering organization</b>	<b><i>f</i></b>	<b><i>%</i></b>
Yes	<b>216</b>	<b>18.4</b>
No	<b>957</b>	<b>81.6</b>
<hr/>		
<b>Age*</b>	<b><i>f</i></b>	<b><i>%</i></b>
18 TO 25	75	6.4
26 TO 35	418	35.6
36 TO 45	260	22.2
46 TO 55	266	22.7
56+	147	12.6
<hr/>		
<b>Recreation Specialization Index Score</b>	<b><i>f</i></b>	<b><i>%</i></b>
Low	390	33.2
Medium	591	50.4
High	192	16.4

**Table 1. Continued**

<b>Participant indicated month of climb</b>	<b><i>f</i></b>	<b><i>%</i></b>
April	68	5.8
May	319	27.2
June	167	14.3
July	195	16.6
August	188	16.0
September	134	11.4
October	12	1.0
Multiple climbs planned	90	7.7
Total	1173	100

### **Reliability**

Cronbach's alpha (Cronbach, 1951), quantifies the degree of internal consistency, often referred to as reliability, for a given set of items. Typically a Cronbach's alpha of at least 0.70 is viewed as the minimum acceptable level of reliability (Nunnally, 1978).

The two scales received acceptable Cronbach alpha scores. The Recreation Specialization Index (RSI) received ( $\alpha=0.852$ ) while the complete Backcountry Visitor Ethics Scale Version 1 (BCVESV-1) received ( $\alpha=0.817$ ).

Upon further inspection, the three separate factors that compose the BCVES-V1 showed mixed ability to be considered reliable on their own: General Backcountry Attitude, ( $\alpha=0.689$ ) Dispose of Waste Attitude, ( $\alpha=0.496$ ) and Campfire Attitude

( $\alpha=0.774$ ). The Cronbach's alpha levels for these three subscales are higher than the Vagias (2009) work, but two of the three scales do not meet minimum acceptable .7 (Nunnally, 1978). However, for research that is exploratory in nature, such as this study, Nunnally (1967) also states, "in early stages of research... reliabilities of .60 or .50 will suffice," (p.226). In addition, reliability levels of .6 or higher may be considered acceptable for scales that contain less than ten items (Lowenthal, 1996). The general backcountry attitude scale ( $\alpha=0.689$ ) was kept for analysis due to this rationale.

The disposal of waste attitude sub-scale was removed from analysis due to poor consistency; however, further exploration was completed per request of the Mount St. Helens climbing program management. Due to management interest, several relationships between participant variables and the single items contained within this scale will be presented later in this chapter, and further discussed in Chapter V. Furthermore, results for the exploratory variables, LNT principle #1, Plan Ahead and Prepare, and LNT principle #7 respect wildlife will also be discussed at the end of this chapter.

**Table 2.**

Descriptive and Reliability results of the RSI (1=Low Specialization, 4= High Specialization) & BCVES-V1

(1 = Very Inappropriate, 7 = Very Appropriate) n = 1173

Scale	<i>M</i>	<i>SD</i>	$\alpha$
<b>Recreation Specialization Index (RSI)</b>	<b>2.44</b>	<b>0.70</b>	<b>0.85</b>

<b>Table 2. Continued</b>	<i>M</i>	<i>SD</i>	$\alpha$
<b>Backcountry Visitor Ethics Scale V-1 (BCVES-V1)</b>	<b>3.42</b>	<b>.906</b>	<b>0.81</b>
<b>General Backcountry Attitude</b>	<b>3.44</b>	<b>0.93</b>	<b>0.69</b>
Walking around muddy spots on the trail.			
Hiking side by side with my friends on existing trails.			
Moving rocks where I plan to place my tent.			
Moving rocks and logs to make a campsite more comfortable.			
When camping in heavily used areas, placing the tent in an undisturbed spot.			
Keeping a small item like a rock or a feather as a souvenir.			
Hiking as a large group (6 or more people)			
<b>Campfire Attitude</b>	<b>3.59</b>	<b>1.44</b>	<b>0.77</b>
Having a campfire			
Cooking over a fire in the backcountry			
Building a fire ring if one is not present			
Leaving charred wood contained in the fire ring			
<b>Dispose of Waste Attitude</b>	<b>3.21</b>	<b>1.15</b>	<b>0.50</b>
Burying used toilet paper			
Urinating on vegetation			
Depositing human waste on the top of the ground so it will decompose more quickly			
Burning paper trash in the campfire.			

## Analysis of Variance Results

For this study, one-way between-subject ANOVAs were conducted to evaluate differences between specialization levels reported by the RSI as they relate to LNT attitudes derived from the BCVES-V1 and the demographic variable time of year. A separate one-way ANOVA was conducted between the participant's RSI score and the demographic variable of affiliation with organized mountaineering group. All ANOVA results were calculated at the 0.05 alpha level.

**ANOVA results exploring Leave No Trace attitudes influenced by specialization group.** Analysis of variance results show significant differences between LNT understanding based on specialization level. (Table 3; Figure 1) The overall LNT ethic scale showed significant differences between groups,  $F= 20.96$ , ( $p < .001$ ).

**Table 3. ANOVA results comparing specialization groups on LNT variables**

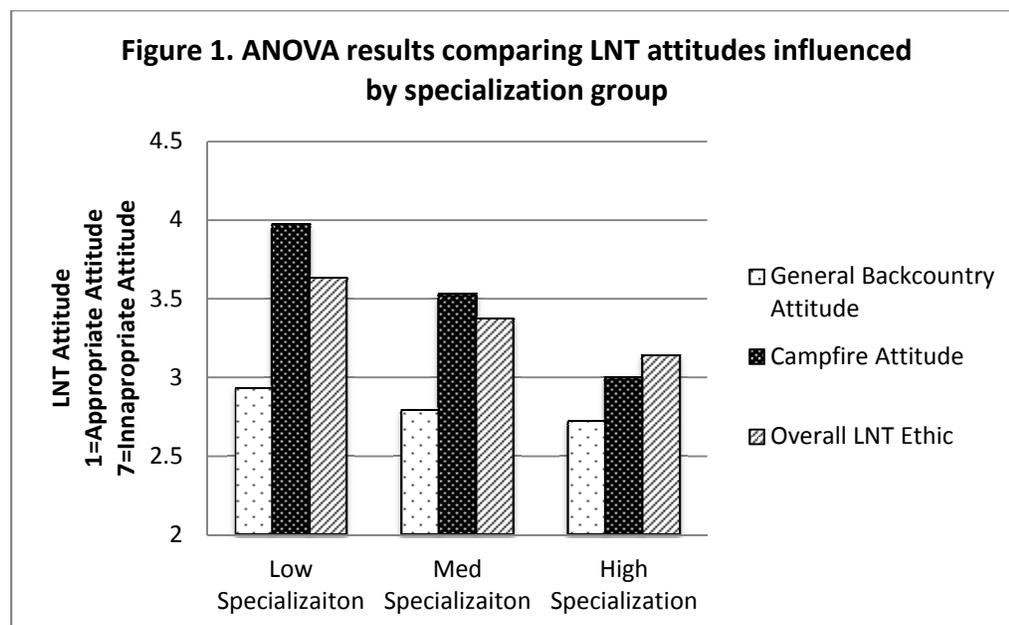
LNT Variables	Low Specialization (n=390)		Med Specialization (n=591)		High Specialization (n=192)		F	p
	M	SD	M	SD	M	SD		
Overall LNT Ethic	3.62	.866	3.37	.913	3.14	.870	20.96	<.001 <sup>1,2,3</sup>
General BC Attitude	2.93	.693	2.79	.688	2.72	.699	7.849	<.001 <sup>1,2</sup>
Campfire Attitude	3.96	1.32	3.53	1.46	3.00	1.43	31.35	<.001 <sup>1,2,3</sup>

Notes:

- 1: Significant differences exist between low and medium specialization groups
- 2: Significant differences exist between low and high specialization groups
- 3: Significant differences exist between medium and high specialization groups

Post hoc analysis revealed significant differences between each of the three specialization groups.

The largest difference was seen in the participants' understanding regarding campfires. The campfire attitude subscale reported a value  $F=31.35$ , ( $p < .001$ ) between groups. Significant differences were found between each of the three specialization groups. The general backcountry attitude sub-scale also showed significance with  $F=7.85$ , ( $p < .001$ ), however, only differences between the low and medium specialization and low and high specialization were found to be significant.

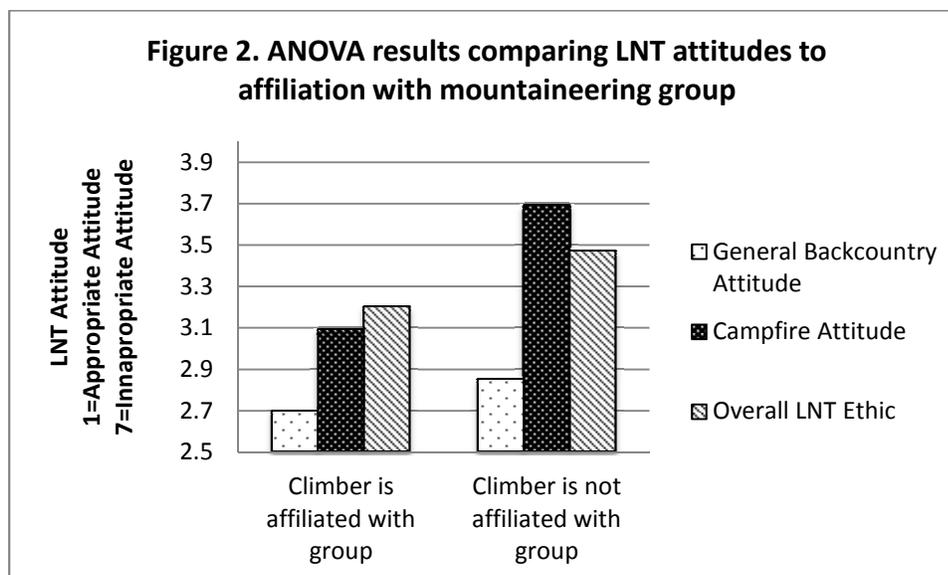


**ANOVA results comparing LNT variables based on affiliation with mountaineering group or organization.** Analysis of variance results showed significant differences between the attitudes regarding the LNT principles based on participant affiliation. (Table 4, Figure 2). All three LNT variables showed to be significantly different between groups. Again, the largest result was regarding campfires,  $F=31.86$

( $p < .001$ ). Overall, the LNT ethic was still heavily influenced by this variable,  $F= 15.76$ , ( $p < .001$ ). And finally, the participant's general backcountry attitude was also significantly affected  $F=8.56$ , ( $p=.004$ ).

**Table 4. ANOVA results comparing mountaineering group affiliation on LNT variables**

LNT Variables	Affiliated with mountaineering group (n=216)		Not affiliated with mountaineering group (n=957)		F	p
	M	SD	M	SD		
Overall LNT Ethic	3.20	.853	3.47	.910	15.79	<.001
General BC Attitude	2.70	.642	2.85	.705	8.55	.004
Campfire Attitude	3.10	1.38	3.69	1.44	31.86	<.001



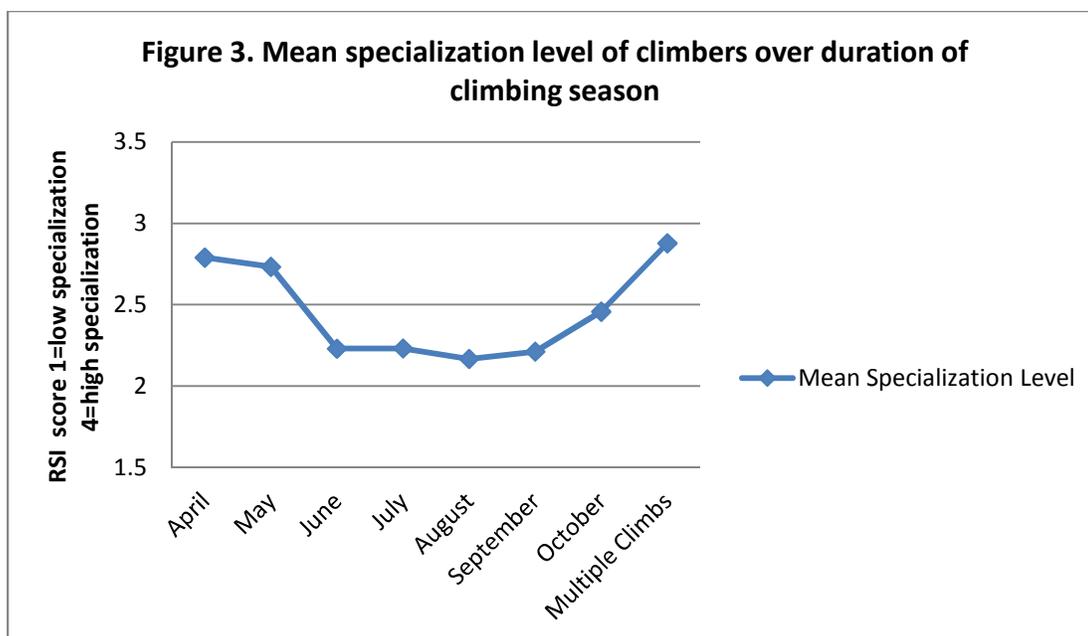
**ANOVA results comparing mean climbers specialization level over the duration of the climbing season.** Analysis of variance results showed significant differences between the mean specialization level of the climbers over the climbing season,  $F=30.5$ , ( $p < .001$ ). Mean specialization score differed significantly between climbers who climbed in April and May, compared to those who climbed in June, July, August, and September. (Table 5, Figure 3). In addition, participants who indicated they intend to climb the mountain several times this year also showed significant differences in terms of their mean specialization score to those who intended to climb in June, July, August, and September.

**Table 5. Mean specialization based on month of climb**

April (n=68)		May (n=319)		June (n=167)		July (n=195)		August (n=188)		September (n=134)		October (n=12)		Multiple Climbs (n=90)		<i>F</i>	<i>p</i>
<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
2.79	.625	2.73	.663	2.23	.651	2.23	.864	2.16	.641	2.21	.626	2.46	.648	2.88	.648	30.5	$p < .001^{1,2}$ .3,4,5,6,7

Notes:

- 1: Specialization mean score for April is significantly different than the mean scores in June, July, August and September
- 2: Specialization mean score for May is significantly different than the mean scores in June, July, August and September
- 3: Specialization mean score for June is significantly different that the mean scores in April, May and Multiple Climbs
- 4: Specialization Mean score for July is significantly different that the mean scores in April, May, and Multiple Climbs
- 5: Specialization mean score for August is significantly different that the mean scores in April, May and Multiple Climbs
- 6: Specialization mean score for September is significantly different than the mean scores in April, May and Multiple Climbs
- 7: Specialization mean score for Multiple Climbs is significantly different than the mean scores in June, July, August and September



### Exploratory variables

Several other variables were of interest to the researchers including: LNT principle #1 plan ahead and prepare, LNT principle #7 respect wildlife, as well as a look into the disposal of waste variables. Although not meeting any requirements of consistency ( $\alpha=0.496$ ), the dispose of waste scale contains variables that were of interest to this research. No claim of validity is intended with these results, however, the management of this resource are concerned with overall understanding of this specific LNT principle, and thus further analysis was conducted. All scale items were scored 1= very inappropriate to 7= very appropriate.

For the LNT principle #1, plan ahead and prepare, three questions were developed to attempt to assess the participant's understanding of this concept. (See Appendix B). The Cronbach's alpha for these three developed questions was determined to be 0.662, which has been deemed acceptable in research that is exploratory in nature and contains

few total items (Nunnally, 1967; Lowenthal, 1996). In terms of concept understanding, little variation was found between any of the specialization groups, affiliation with organization, or time of year. A significant difference was found between the high specialization group ( $M=1.34$ ) and the low specialization group ( $M=1.56$ ) for one question, however both means were heavily skewed toward the appropriate concept understanding (1). This same significant difference was found between members of organized groups ( $M=1.21$ ) and non-members ( $M=1.56$ ) and again both of these means are heavily skewed toward the appropriate answer of (1).

LNT principle #7, respect wildlife, produced an acceptable alpha level of 0.878, but little variation was found between any of the variables: specialization groups, group affiliation, or time of year. These results are congruent with the work done by Vagias (2009), which suggested a broad understanding of this principle by outdoor enthusiasts.

LNT principle #3 dispose of waste properly is fully encompassed within the dispose of waste attitude scale. On an individual level, some of the variables contained within the scale were influenced by level of specialization, and affiliation with mountaineering group.

Question one concerned the appropriateness of burying used toilet paper. A significant difference was found regarding the attitudes of the high specialization group ( $M=3.98$ ) and both the medium ( $M=4.40$ ) the low specialization group ( $M=4.71$ ) regarding this situation. This will be further discussed in chapter V. Another significant difference was located regarding the appropriateness of leaving human waste on top of the soil between the high specialized group ( $M=1.62$ ) and the low specialized group ( $M=$

1.98) however, similar to the LNT principles #1 and #7, the overall response is heavily skewed toward the appropriate response (1).

Group or organization affiliation revealed one significant difference. The difference was found regarding the situation of what to do with used toilet paper in outdoor settings. Members of mountaineering groups scored ( $M=4.01$ ) and non-members scored ( $M=4.49$ ). This also will be discussed in chapter V.

The following chapter will consist of a discussion and present conclusions based on the results and findings from this study as related to the literature review. In addition, the following chapter will provide overall conclusions and recommendations for future research.

## **Chapter V**

### **Discussion**

This chapter will discuss the results from the survey implementation as related to the three hypotheses: (1) there will be a significant difference between the attitudes of higher specialized mountaineers and lower specialized mountaineers regarding the Leave No Trace principles, (2) there will be a significant difference regarding the comprehension of the Leave No Trace principles between members of organized mountaineering groups and non-members, and (3) there will be a significant difference in mean specialization level of the climbers over the duration of the Mount St. Helens climbing season. This chapter will consist of s sections in the following order: recreation specialization and Leave No Trace attitudes, mountaineering organization affiliation and Leave No Trace attitudes, recreation specialization and time of year, additional variables explored, conclusion, implications, and recommendations for future study.

#### **Recreation specialization and Leave No Trace attitudes**

The first hypothesis, there will be a significant difference between the attitudes of higher specialized mountaineers and lower specialized mountaineers regarding the Leave No Trace principles was supported by this study. Results from this study showed significant differences exist between each of the three specialization groups as related to the Leave No Trace variables regarding participants' overall LNT ethic ( $p < .001$ ), general backcountry attitudes ( $p < .001$ ), and campfire attitudes ( $p < .001$ ). This research further supports the theory that participants in mountaineering are not a homogeneous group of individuals (Bryan, 1979; Dyck et al., 2003). This research also supports Bryan's (1977)

claim that within specialization groups, there are distinguishing characteristics and preferences that separate participants. The differences in this case may lie within the attitudes, beliefs and appropriate actions regarding the LNT principles. Dyck et al., (2003) also suggest that as an individual becomes more specialized in an activity, he or she tends to develop favorable attitudes toward the resource where the activity occurs. In addition, the data in this study supports findings by Chipman and Helferich, (1988), which propose that more specialized individuals have an increasing desire to protect the recreation resources they are utilizing.

**Overall LNT ethic.** This scale produced respondent's total LNT ethic score by combining the 5 LNT principles assessed within the sub-scales contained in the BCVES-V1. (General backcountry attitude scale, dispose of waste attitude scale, and campfire attitude scale). This LNT ethic score was compared with the respondents RSI score for analysis. Overall results showed that significant statistical differences separate the scores of the lower specialized respondents to the medium and high specialized respondent's in terms of overall LNT ethic score. (Table 3, Appendix #). Overall, the low specialized respondents indicate more inappropriate responses to the LNT situations offered, which may be due to confusion regarding appropriate LNT action. Manning (2011) notes that these inappropriate actions may not be purposeful, but may be due to an absence of understanding of the correct practices.

In addition, the US Forest Service Ptarmigan Trailhead design narrative (1987), for the summer trailhead, specified a need for rustic setting due to the prevalence of experienced climbers, however, the current data now suggests the climber's overall experience level does appear to fluctuate over a given climbing season, and thus a

different facility design may be needed to aid in correctly managing this area. The data shows that a variance in experience or skill in the mountaineering environment does have a correlation to an individual's understanding and attitude regarding LNT and minimum impact practices.

**General backcountry attitude.** The general backcountry attitude sub-scale, which contains questions designed to assess the Leave No trace principles #2 travel and camp on durable surfaces, #4 leave what you find, and #6 be respectful of other visitors, showed significant differences between the specialization groups ( $p < .001$ ). Post hoc analysis showed that low specialization climbers were significantly different than the medium and high specialization climbers regarding attitudes toward these principles. Participants with higher specialization levels responded in a linear direction appropriate with an increase in LNT understanding. These results indicate that higher specialized climbers have attitudes that are more congruent with the LNT principles regarding these situations.

Bryan (1979) notes that lower specialized climbers are often in search of results, they want to make it to the top of the mountain by any means necessary. Whereas the opposite, higher specialized climbers, are often participating in the activity not necessarily for results, but just to enjoy the activity, and frequently have higher resource protection preferences (Ditton et al., 2001). Vaigas and Powell (2010) also note wide variation regarding the principles contained within this subscale.

Within this population, lower specialized individuals are separated by a statistically significant score, however, all three specialization groups are slightly skewed

toward the appropriate LNT answer with means less than (4). Vaigas and Powell (2010) note, regarding LNT principle #2, travel and camp on durable surfaces that, “the relatively high variability (*SD*) in scores on certain behaviors suggests that certain recommended practices may not be fully understood or supported by backcountry visitors” (p. 26).

Managers of this area should take note that the data shows lower specialized climbers appear to have attitudes that according to Fishbein and Ajzen (1975) and Ajzen (1991), may correlate to actions producing greater negative ecological impact on this recreation resource than medium and high specialized climbers.

**Campfire attitudes.** The campfire sub-scale, which contains questions designed to assess the Leave No Trace principle #4 minimize campfire impacts, showed significant differences between the specialization groups ( $p < .001$ ). Post hoc analysis showed that attitudes relating to campfires differed significantly between each of the three specialization groups. As the specialization level of the participants increased, so did the more appropriate attitudes regarding this LNT principle. This sub-scale showed the largest degree of variation between the understanding of the LNT principle based on level of specialization (low specialization mean 3.97- high specialization mean 3.0) with (1.0) being the appropriate answer. This suggests that lower specialized climbers are more likely to build a fire than medium or highly specialized climbers. While a significant difference does exist between groups, both means are relatively close to the center of the scale, possibly indicating an undecided or unsure understanding of this principle. According to Leave No Trace (2013) having a campfire is very inappropriate in most situations, however, Vagias and Powell (2010) note that campfires have long been apart

of the outdoor experience and their previous work exploring this principle also shows wide variation in perceived appropriateness (Vaigas & Powell, 2010).

This situation also presents an interesting situation for managers of this resource. The two climbing routes (Winter/ Summer) begin at different trailheads. The summer trailhead contains a limited number of installed campfire rings designed to provide an established campfire site, however, the winter trailhead contains no developed campfire rings and may be experiencing increased damage related to this principle. The US Forest Service management has noticed the increase in use associated with this Sno-Park, and has begun initial planning steps for campground development in this area (Walker, personal communication, 2013).

#### **Mountaineering organization affiliation and Leave No Trace attitudes.**

The second hypothesis stated that individuals associated with a mountaineering group or organization will have attitudes that are more congruent with the desired LNT design and the data from this research supports this hypothesis. Significant differences in LNT attitudes were found in those who were affiliated with such groups over non-members across all of the LNT variables. Worthy of note is that over 94% of respondents who were members of mountaineering groups fell into the medium or high specialization groups. Other demographic data showed that only 3% of low specialized climbers belonged to an organized group, while 22% of medium specialized climbers belonged to an organized group, and 50% of highly specialized individuals were associated with organized groups. Thus further supporting Bryan's (1977) construct that as individuals

progress in specialization over time, they tend to associate themselves with organized groups.

However, the demographic data shows that only 18.4% of respondents at this location had an affiliation with a mountaineering group. With less than 1/5 of the population belonging to any such group, the differences in the data, regarding appropriate attitudes, that these groups appear to have, does not seem to affect the majority of climbers.

### **Recreation specialization and time of year.**

The third hypothesis for this study stated that there would be a significant difference between the mean specialization level of the climbers over the duration of this climbing season. The returned data supports this hypothesis.

The most highly specialized group of participants were those who indicated they would be climbing Mount St. Helens on multiple occasions, followed closely by those who climbed in April and May. Alternatively, the lowest mean specialization months were August and September when the highest number of lower specialized climbers is reported.

One factor that may have a large influence on this difference in specialization level is the topography of the recreation resource itself. During the months of April and May, the mountain is covered in snow and ice, thus lending itself to several varieties of alternative travel (snowshoes, skis, snowboard, snowmobile). Bryan (1977;1979) notes more specialized individuals tend begin to use different specialized equipment. Bryan (1977) refers to these individuals as, “gadget manipulators” (p. 88) or people who have

the newest high-tech equipment. It is also noted that many local mountaineering organizations have long-standing traditions to climb Mount St. Helens in early May, thus injecting a number of more specialized climbers onto the mountain. As noted earlier, 50% of respondents who were in the highly specialized category were members of organized mountaineering groups.

During the spring mountaineering season, many ecological impacts are negated due to the snow covering the climbing routes, and a larger percentage of climbers are shown to belong to the high specialization category. However, during the months of August and September, when the snow is no longer covering the mountain, the majority of climbers are considered low specialization, and these individuals may be intensifying the negative ecological impacts to the resource.

Managers should be aware that the difference in LNT attitudes presented by the differing levels of specialization over time presents an ability to predict and specifically target groups of climbers with pertinent information regarding the LNT principles.

**Additional variables.**

The exploratory variables of interest, LNT principle #1 plan ahead and prepare, LNT principle #7 respect wildlife, and the LNT principle #3 dispose of waste attitude scale, showed significant differences across the independent variables.

For the LNT principle #1, plan ahead and prepare, the respondents were asked to indicate the appropriateness of three questions: “carrying a map and compass/GPS device”, “researching current conditions of the trail/ area where traveling” and “carrying extra food and water” using a 7 point Likert scale. Results showed no variation between

specialization groups or based on time of year. However, there was a significant difference found regarding this principle based on affiliation to a mountaineering organization. The respondents associated with an organized group had a statistically significant more appropriate attitude toward this principle, but both means were heavily skewed toward the appropriate attitude. This suggests that respondents to this study have an overall appropriate attitude toward this LNT principle. Participants in this study appear to believe that planning ahead and preparing is appropriate before venturing up Mount St. Helens.

Managers of this resource may be comforted knowing that this population appears to desire information before beginning their adventure. This also requires that managers provide current and accurate information across all outlets. Due to the high levels of use, frequently updated and detailed information may be needed to satisfy all levels of inquiry.

Questions regarding LNT principle #7, respect wildlife, were assessed by asking respondents to indicate the appropriateness of two questions: “dropping food on the ground to provide wildlife a food source” and “feeding wildlife” using a 7 point Likert scale. Results produced no significant differences between specialization levels, affiliation with groups, or time of year. These results support Vagias and Powell’s (2010) results indicating that there is seems to be a common understanding about this principle. Based on the data, the majority of respondents understand that feeding wildlife is very inappropriate.

The LNT principle #3, dispose of waste properly, was assessed by asking respondents to indicate the appropriateness of four questions that comprised the dispose of waste attitude scale: “burying used toilet paper,” “urinating on vegetation,” “depositing human waste on top of the ground so it will decompose rapidly,” and “burn paper trash in the campfire” on a 7 point Likert scale. This scale did not meet Cronbach’s alpha standards and was not included in analysis. However, the management of this area are concerned with attitudes of the climbers regarding human waste, thus the individual items within the scale were analyzed further using several variables.

The only significant differences were found between specialization levels regarding the third question, “burying used toilet paper.” The high specialized group ( $M=3.98$ ) medium ( $M=4.40$ ) and the low specialization group ( $M=4.71$ ) all have scores that are near (4) which would indicate the neutral selection on the 7 point Likert scale. Similar to the data produced by specialization level, participant affiliation or non-affiliation, with mountaineering organizations produced data close to the neutral answer for this question. Members of mountaineering groups scored ( $M=4.01$ ) and non-members scored ( $M =4.49$ ).

This may indicate confusion among all groups regarding what to do with human waste in this environment. The management of this area may not want to rely on the climber’s attitudes and knowledge pertaining to this LNT principle. The managers of this area should consider providing clear directions or instructions of the desired actions to increase LNT awareness and resource protection goals.

## Conclusions

The purpose of this study was to explore how levels of recreation specialization, mountaineering group affiliation, and time of year influenced an individual's attitudes regarding the Leave No Trace minimum impact ethics. Currently, only one study has examined the population of mountaineers and their attitudes regarding the LNT principles (Dyck, et al., 2003). This study adds to this limited knowledge base and this is the first study to examine a real world mountaineering population regarding these two variables. This is also the first study exploring this population using the RSI (Salz, Loomis & Finn, 2001) and the BCVES-V1 (Vaigas, 2009). In addition, this is the first study known to examine the construct of recreation specialization with the variable of time of year.

Bryan (1979) proposed that mountaineers can be placed into several categories: novice, new American super climber, Himalayan-class climber, and free climber. The data from this study does support the construct of recreation specialization proposed by Bryan (1977), however, no attempt was made to classify such typologies of climbers. The climbers within this study were simply placed into low, medium, and high specialization groups. Since Bryan's 1979 research, the sport of mountaineering has been labeled adventure recreation or risk recreation (Ewert, 1985) and more recently, this sport has been placed under the classification of adventure tourism (Pomfret, 2006). What is clear is that this sport has evolved over the past several decades and many advances have made this activity more accessible to a wider variety of interested individuals. Pomfret (2012) specifically cites improved tourist infrastructure, easier accessibility, and diminished risk levels as factors that have facilitated this evolution. What ever the reasons may be, the

climbing population at Mount St. Helens appears to have experienced a similar change in participants over the past 30+ years.

In 1987, the Ptarmigan trail was opened providing access to climbers who the US Forest Service originally believed were highly experienced. Ewert (1990) was the first to realize this specific population of mountaineers was different than others, suggesting that these climbers were more sightseers rather than traditional mountaineers. The data from this study actually may support both previous examinations, as well as provides new insight to this unique group of recreation enthusiasts. There are experienced, highly specialized climbers who participate in climbing this mountain, but the majority appear to use this resource in the early spring and do not account for a large number of climbers throughout the remainder of the climbing season. The data shows these experienced climbers do have a better understanding of LNT principles than less experienced climbers. The data also shows that most of the 2013 summer climbers (June –August) are climbers who are not highly specialized, and these individuals have attitudes that suggest a more incomplete understanding of the correct LNT actions requested of them.

Taff (2012) has shown populations similar to this can be educated through specific and targeting messaging, consequently increasing awareness to the appropriate actions desired. If an increase in correct actions can occur through messaging, this may lead to an increase in the participant's overall knowledge base. If the participant's knowledge increases, the participant's specialization level may also increase. The data within this study shows these higher specialized individuals have attitudes that are more congruent with the design of the LNT principles. More climbers with attitudes in line with LNT principles may ultimately lead to a higher level of resource protection.

## **Implications.**

Consistent with national trends, the increasing amount of use for this recreation area may be causing increased damage to Mount St. Helens. If uneducated or improper use is occurring, the negative impacts associated with outdoor recreation activities, such as mountain climbing, may be amplified. The data from this study has identified several differences in attitudes regarding the minimum impact practices endorsed by the Leave No Trace Center for Outdoor Ethics based on the specialization level of the individual. Based on the data gathered in this study, people who lie on the higher end of Bryan's (1977) specialization continuum better understand the correct LNT practices for the mountain environment. Efforts should be made to increase the overall level of knowledge regarding all LNT principles for the individuals who are on the lower end of the specialization spectrum. Managers of this area can use this specialization data to predict educational needs and may be able to target the lower specialized group that appears in June, July, August, and September to inform visitors about correct Leave No Trace actions and to increase overall resource protection.

The data from this study has also shown that there appears to be confusion, specifically regarding disposal of waste in the mountain environment among all experience levels, and this may be having a negative impact on the recreation resource itself. The message regarding the disposal of waste provided from the Leave No Trace Center has not changed in many years, however there seems to be a disconnect between the desires of LNT, and the attitudes and understanding of people who participate in mountaineering in this location. This finding is consistent with the previous work of Vagias and Powell (2010). A closer look at the current message may be needed to

identify and explore other options regarding how to best convey the desires of LNT in hopes to reduce this confusion. Managers of this recreation area may consider very specific messaging outlining desired actions to both increase resource protection and the knowledge level of the climbers. For example, instructing climbers how far away from the trail they should travel before urinating will increase their appropriate LNT knowledge, decrease the amount of human waste deposited on the trail itself, and ultimately keep the trail an attractive outdoor area.

Also worthy of note is the relationship between outdoor club affiliation and Leave No Trace attitudes. Managers may take note that persons who belong to an organized group do appear to have attitudes that are more congruent with LNT, and thus, these individuals may have less impact on recreational areas. Encouraging visitors to become involved with these groups may be appropriate in the future, or providing outlets for these organizations to promote themselves may be beneficial.

### **Recommendations for future study**

This study did produce significant findings, however, similar studies should be conducted to aid in validating these results. Specifically, further investigation of the relationship between recreation specialization and Leave No Trace attitudes should be completed in various other recreation environments to continue development of this limited knowledge base. The exploration of these variables on other climbing populations and mountains will aid in a more holistic picture of the mountaineering population found in this region. Follow up studies could be completed on this population after a designed messaging intervention in an attempt to measure effectiveness of such programs. More

research is needed regarding the development of tools available to accurately assess the attitudes of visitors regarding the LNT variables.

Additional research is needed to examine the effectiveness of the current messaging that LNT provides in the seven principles. Some variables may need to be re-examined and reconstructed to further aid in the appropriate education of outdoor enthusiasts.

The US Forest Service should continue to examine recreation populations like the one assessed on Mount St. Helens. With the widespread availability of online databases, such as the one use in this study, research should continue to examine and educate user groups such as this. Most federal agencies now operate permit and campground reservations using the website Recreation.gov, thus providing an opportunity for a brief LNT, or other desired educational message to be given..

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## Appendix A

### Recreation Specialization Index (RSI), adapted from Hawkins, Loomis, and Salz. (2009)

For the following 4 questions, please select the statement below that most accurately reflects your belief about mountaineering. These questions are intended to gain information about your mountaineering background, and previous experiences.

#### **1. When I participate in the sport of mountaineering I feel like:**

1. a beginner. I don't really feel like I am a part of the mountaineering scene.
2. an occasional or irregular participant. Sometimes it is fun, entertaining, or rewarding to mountaineer.
3. a habitual and regular participant in mountaineering.
4. an insider to the sport. Mountaineering is an important part of who I am.

#### **2. During a mountaineering experience, I can be described as:**

1. having very little understanding of mountaineering. I am often unsure about how to do certain things when I am mountaineering.
2. having some understanding of mountaineering, but still in the process of learning more about sport. I am becoming more familiar and comfortable with the activity
3. being comfortable with mountaineering. I have a good understanding of what I can do while participating in mountaineering, and know how to do it.
4. a knowledgeable expert in mountaineering. I encourage, teach, and enhance opportunities for others who are interested in mountaineering.

#### **3. My relationship with others who mountaineer are:**

1. not established. I really don't know any other people who mountaineer.
2. very limited. I know some other people who mountaineer by sight and sometimes talk with them, but I don't know their names.
3. one of familiarity. I know the names of others who mountaineer, and often speak with them.
4. close. I have personal and close relationships with other people who mountaineer. These friendships revolve around the sport.

#### **4. My commitment to mountaineering is:**

1. very slight. I have little connection to mountaineering. I may or may not continue to participate in the sport in the future.
2. moderate. I will continue to mountaineer as long as it is entertaining and provides the benefits I want.
3. fairly strong. I have a sense of being a member of the activity, and it is likely that I will continue to mountaineer for a long time.
4. very strong. I am totally committed to mountaineering. I encourage other to participate in the sport and seek to ensure that the sport continues into the future.

**Appendix A (continued)**Backcountry Visitor Ethics Scale Version 1 (BCVES-V1), adapted from Vaigas (2009)

For the 21 statements below, please indicate your level of agreement by selecting the number that most accurately reflects your attitude about the appropriateness of the given situation. 1= Very Inappropriate      4= Neutral      7= Very Appropriate

Please indicate the appropriateness level of each item	Very Inappropriate			Neutral			Very Appropriate
5. Carrying a map and compass/GPS device	1	2	3	4	5	6	7
6. Researching current conditions of the trail	1	2	3	4	5	6	7
7. Carrying extra food and/or water	1	2	3	4	5	6	7
8. Walking around muddy spots on the trail.	1	2	3	4	5	6	7
9. Hiking side by side with my friends on existing trails.	1	2	3	4	5	6	7
10. Moving rocks where I plan to place my tent.	1	2	3	4	5	6	7
11. Moving rocks and logs to make a campsite more comfortable	1	2	3	4	5	6	7
12. When camping in heavily used areas, placing the tent in an undisturbed spot.	1	2	3	4	5	6	7
13. When camping in heavily used areas, placing the tent in an undisturbed spot.	1	2	3	4	5	6	7
14. Burying used toilet paper	1	2	3	4	5	6	7
15. Urinating on vegetation	1	2	3	4	5	6	7
16. Depositing human waste on top of the ground so it will decompose rapidly.	1	2	3	4	5	6	7
17. Burn paper trash in the campfire	1	2	3	4	5	6	7
18. Having a campfire	1	2	3	4	5	6	7
19. Cooking over a fire in the backcountry	1	2	3	4	5	6	7
20. Building a fire ring if one is not present	1	2	3	4	5	6	7
21. Leaving charred wood contained in the fire ring	1	2	3	4	5	6	7
22. Keeping a single small item like a rock or a feather as a souvenir	1	2	3	4	5	6	7
23. Hiking as a large group (6 or more people)	1	2	3	4	5	6	7
24. Dropping food on the ground to provide wildlife a food source	1	2	3	4	5	6	7
25. Feeding wildlife	1	2	3	4	5	6	7

## Appendix B

### Cover Letter

---

Dear Mount St. Helens Climber,

We are writing to ask for your assistance with a study being conducted through the Mount St. Helens Institute and Eastern Washington University. This study is a part of a Master of Science thesis project. This study has two purposes: (1) to identify characteristics of the climbers of Mount St. Helens, and (2) to determine the attitudes of the climbers of Mount St. Helens regarding to the Leave No Trace Principles.

You have been selected to participate in this study based on your registration to climb Mount St. Helens during the 2013 climbing season. Your response in this survey may aid researchers, the Mount St. Helens Institutes, and the U.S. Forest Service to better serve your needs. If you are under the age of 18, please do not fill out the survey.

This is a short survey and should take approximately 10 minutes to complete. Please click on the link below to access the survey website (or copy and paste the survey link into your Internet browser) to begin the survey. Please only fill out the survey one time.

Survey Link:

<https://docs.google.com/forms/d/1TDSJSHGo6QNwDGQqXnxo6PRl0xIxx6a7teBdZ-IqnaE/viewform>

Your participation in this survey is completely voluntary and your responses are submitted anonymously. No personally identifiable information will be requested. Your completed survey will be stored in a secure online format that only the researchers can view. If you have any concerns about your rights as a participant in this research or any complaints you wish to make, you may contact Ruth Galm, Human Protections Administrator at Eastern Washington University at [509-359-7971](tel:509-359-7971) x6567 or [rgalm@ewu.edu](mailto:rgalm@ewu.edu)

It is through help from climbers like you that managers of this program can better serve your needs and preference. By completing this survey you will help the results of this study be more accurate, due to the assessment of a broad representation of mountain climbers such as yourself. If you do not wish to respond, please delete this email and thank you for your time.

Thank you for participating in this study and enjoy your time on Mount St. Helens! If you have any further questions or concerns, please feel free to contact the researcher at [lparsons49@ewu.edu](mailto:lparsons49@ewu.edu) or [360-852-7381](tel:360-852-7381), or the Mount St. Helens Institute at [360-449-7883](tel:360-449-7883).

Sincerely,

Luke Parsons  
Physical Education Health & Recreation Graduate Student/ Primary Investigator  
[lp Parsons49@ewu.edu](mailto:lp Parsons49@ewu.edu)  
[360-852-7381](tel:360-852-7381)

Dr. Matthew Chase  
Director Physical Education Health & Recreation  
[mchase@ewu.edu](mailto:mchase@ewu.edu)

Travis Southworth-Neumeyer  
Executive Director Mount St. Helens Institute  
[tneumeyer@mshinstitute.org](mailto:tneumeyer@mshinstitute.org)

**Appendix B (continued)**

## Survey Instrument

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# Mount St. Helens Registered Climber Survey 2013

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Thank you for participating in this study.  
Please read each question carefully before selecting your answer. Please respond honestly, keeping in mind that there are no right or wrong answers. This survey will take approximately 10 minutes to complete.

There are 3 sections to this survey: Section (1) asks about your mountaineering experience and commitment. Section (2) includes questions about your Leave No Trace attitudes in a given situation. Section (3) contains demographic questions.

As mentioned in the email, this study is completely voluntary. Your responses are completely anonymous. Your name or any other personally identifiable information will not be asked at any point in the survey.

Your completed response may help managers of the Mount St. Helens climbing program better serve your needs and preferences.

Results from this survey can be sent to you via email at your request. For a summary of the results please feel free to contact the researcher using the email address provided in the contact letter I have sent you ([Lparsons49@ewu.edu](mailto:Lparsons49@ewu.edu)). It is estimated that results will be completed by June 2013.

Thank you for your participation!

Luke Parsons  
Graduate Student  
Eastern Washington University

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## Appendix B (continued)

### Survey Instrument

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Mount St. Helens Registered Climber Survey 2013

8/10/13 6:59 PM

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# Mount St. Helens Registered Climber Survey 2013

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\* Required

### Section 1 of 3: Your connection to mountaineering

For the following 4 questions, please select the statement below that most accurately reflects your association with the sport of mountaineering.

*When I participate in the sport of mountaineering I feel like:* \*

- 1. a beginner. I don't really feel like I am a part of the mountaineering scene.
- 2. an occasional or irregular participant. Sometimes it is fun, entertaining, or rewarding to mountaineer.
- 3. a habitual and regular participant in mountaineering.
- 4. an insider to the sport. Mountaineering is an important part of who I am.

*During a mountaineering experience, I can be described as:* \*

- 1. having very little understanding of mountaineering. I am often unsure about how to do certain things when I am mountaineering.
- 2. having some understanding of mountaineering, but still in the process of learning more about the sport. I am becoming more familiar and comfortable with the activity.
- 3. being comfortable with mountaineering. I have a good understanding of what I can do while participating in mountaineering, and know how to do it.
- 4. a knowledgeable expert in mountaineering. I encourage, teach, and enhance opportunities for others who are interested in mountaineering.

*My relationships with others who mountaineer are:* \*

- 1. not established. I really don't know any other people who mountaineer.

## Appendix B (continued)

### Survey Instrument

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Mount St. Helens Registered Climber Survey 2013

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- 2. very limited. I know some other people who mountaineer by sight and sometimes talk with them, but I don't know their names.
- 3. one of familiarity. I know the names of others who mountaineer, and often speak with them.
- 4. close. I have personal and close relationships with other people who mountaineer. These friendships revolve around the sport.

---

#### *My commitment to mountaineering is:* \*

- 1. very slight. I have little connection to mountaineering. I may or may not continue to participate in the sport in the future.
- 2. moderate. I will continue to mountaineer as long as it is entertaining and provides the benefits I want.
- 3. fairly strong. I have a sense of being a member of the activity, and it is likely that I will continue to mountaineer for a long time.
- 4. very strong. I am totally committed to mountaineering. I encourage others to participate in the sport and seek to ensure that the sport continues into the future.

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## Appendix B (continued)

### Survey Instrument

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# Mount St. Helens Registered Climber Survey 2013

---

\* Required

### Section 2 of 3: Leave No Trace

For the statements below, please select the number that most accurately reflects your attitude about the appropriateness of the given statement.

1= Very Inappropriate    4= Neutral    7= Very Appropriate

---

*Carrying a map and compass/GPS device.* \*

1= Very Inappropriate 4= Neutral 7= Very Appropriate

1 2 3 4 5 6 7

Very Inappropriate        Very Appropriate

---

*Researching current conditions of the trail/ area where traveling.* \*

1= Very Inappropriate 4= Neutral 7= Very Appropriate

1 2 3 4 5 6 7

Very Inappropriate        Very Appropriate

---

*Carrying extra food and water.* \*

1= Very Inappropriate 4= Neutral 7= Very Appropriate

1 2 3 4 5 6 7

Very Inappropriate        Very Appropriate

## Appendix B (continued)

### Survey Instrument

---

Mount St. Helens Registered Climber Survey 2013

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*Walking around muddy spots on the trail. \**

1= Very Inappropriate 4= Neutral 7= Very Appropriate

1 2 3 4 5 6 7

Very Inappropriate        Very Appropriate

---

*Hiking side by side with my friends on existing trails. \**

1= Very Inappropriate 4= Neutral 7= Very Appropriate

1 2 3 4 5 6 7

Very Inappropriate        Very Appropriate

---

*Moving rocks where I plan to place my tent. \**

1= Very Inappropriate 4= Neutral 7= Very Appropriate

1 2 3 4 5 6 7

Very Inappropriate        Very Appropriate

---

*Moving rocks and logs to make a campsite more comfortable \**

1= Very Inappropriate 4= Neutral 7= Very Appropriate

1 2 3 4 5 6 7

Very Inappropriate        Very Appropriate

---

*When camping in heavily used areas, placing the tent in an undisturbed spot. \**

1= Very Inappropriate 4= Neutral 7= Very Appropriate

1 2 3 4 5 6 7

Very Inappropriate        Very Appropriate

---

*Burying used toilet paper \**

1= Very Inappropriate 4= Neutral 7= Very Appropriate

1 2 3 4 5 6 7

Very Inappropriate        Very Appropriate

---

## Appendix B (continued)

### Survey Instrument

---

Mount St. Helens Registered Climber Survey 2013

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---

***Urinating on vegetation*** \*

1= Very Inappropriate 4= Neutral 7= Very Appropriate

1 2 3 4 5 6 7

Very Inappropriate        Very Appropriate

---

***Depositing human waste on top of the ground so it will decompose rapidly*** \*

1= Very Inappropriate 4= Neutral 7= Very Appropriate

1 2 3 4 5 6 7

Very Inappropriate        Very Appropriate

---

***Burn paper trash in the campfire*** \*

1= Very Inappropriate 4= Neutral 7= Very Appropriate

1 2 3 4 5 6 7

Very Inappropriate        Very Appropriate

---

***Having a campfire*** \*

1= Very Inappropriate 4= Neutral 7= Very Appropriate

1 2 3 4 5 6 7

Very Inappropriate        Very Appropriate

---

***Cooking over a fire in the backcountry*** \*

1= Very Inappropriate 4= Neutral 7= Very Appropriate

1 2 3 4 5 6 7

Very Inappropriate        Very Appropriate

---

***Building a fire ring if one is not present*** \*

1= Very Inappropriate 4= Neutral 7= Very Appropriate

1 2 3 4 5 6 7

Very Inappropriate        Very Appropriate

---

## Appendix B (continued)

### Survey Instrument

Mount St. Helens Registered Climber Survey 2013

8/10/13 6:59 PM

#### *Leaving charred wood contained in the fire ring* \*

1= Very Inappropriate 4= Neutral 7= Very Appropriate

1 2 3 4 5 6 7

Very Inappropriate        Very Appropriate

#### *Keeping a single small item like a rock or a feather as a souvenir* \*

1= Very Inappropriate 4= Neutral 7= Very Appropriate

1 2 3 4 5 6 7

Very Inappropriate        Very Appropriate

#### *Hiking as a large group (6 or more people)* \*

1= Very Inappropriate 4= Neutral 7= Very Appropriate

1 2 3 4 5 6 7

Very Inappropriate        Very Appropriate

#### *Dropping food on the ground to provide wildlife a food source* \*

1= Very Inappropriate 4= Neutral 7= Very Appropriate

1 2 3 4 5 6 7

Very Inappropriate        Very Appropriate

#### *Feeding wildlife* \*

1= Very Inappropriate 4= Neutral 7= Very Appropriate

1 2 3 4 5 6 7

Very Inappropriate        Very Appropriate

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## Appendix B (continued)

### Survey Instrument

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Mount St. Helens Registered Climber Survey 2013

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# Mount St. Helens Registered Climber Survey 2013

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\* Required

### Section 3 of 3: Demographic Questions

For the following questions, please select the appropriate option(s).

*Will you be considered the "leader" of your group while climbing Mount St. Helens? \**

If you are climbing Mount St. Helens by yourself select "Yes"

- Yes  
 No

*Have you participated in an official Leave No Trace training program? \**

Please select the highest level of training you have attended. If "Other" please specify the type of training you have received.

- No  
 LNT Awareness Workshop  
 LNT Trainer Course  
 LNT Master Educator Course  
 Other:

*Do you ever teach Leave No Trace practices to other people in your group while recreating? \**

Please select the number that most closely resembles the the frequency you teach LNT.

1 2 3 4 5 6 7

Never        Always

## Appendix B (continued)

### Survey Instrument

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Mount St. Helens Registered Climber Survey 2013

8/10/13 7:06 PM

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#### *What month is your planned climb of Mount St. Helens? \**

Please select the month you plan to climb Mount St. Helens. If multiple climbs are planned, please select "Multiple Climbs Planned" and indicate in the next question which months you plan to climb Mount St. Helens

- April
- May
- June
- July
- August
- September
- October
- Multiple Climbs Planned

---

#### *If you selected "Multiple Climbs Planned" above, please check all months you plan to climb Mount St. Helens*

If you are not planning to climb multiple times, please skip to the next question.

- April
- May
- June
- July
- August
- September
- October

---

#### *What will be your primary mode of travel while climbing Mount St. Helens? \**

- On foot
- On snowshoes
- On skis or split-board
- On snowmobile
- Other:

---

#### *Are you affiliated with a mountaineering club or organization? \**

If yes, please indicate the name of the organization in the box below.

## Appendix B (continued)

### Survey Instrument

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Mount St. Helens Registered Climber Survey 2013

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- Yes, please write in name below  
 No

---

*Name of club or organization, and location.*



---

*What is your satisfaction level with the Mount St. Helens climbing permit process? \**

Please select the number that most closely resembles your satisfaction level.

1 2 3 4 5 6 7

Very Unsatisfied        Very Satisfied

---

*What are the most frustrating aspects of the Mount St. Helens climbing permit process to you? \**

Please select all that apply. If you select "Other" please write in your answer in the box provided.

- The process does not frustrate me  
 The online aspect  
 Having to pick up my permit in Cougar  
 Having to buy a permit  
 Other:

---

*What is your gender? \**

- Male  
 Female

---

*What is your age in years? \**

Please type in your age below



---

*Do you have any questions or additional comments?*

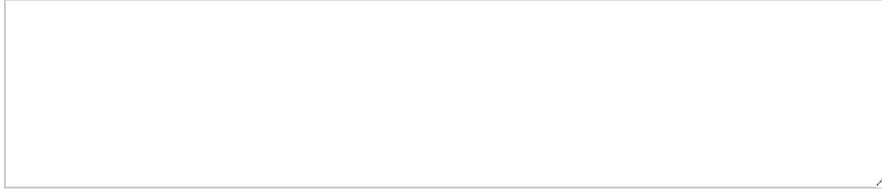
## Appendix B (continued)

### Survey Instrument

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Mount St. Helens Registered Climber Survey 2013

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**Appendix B (continued)**Follow up Letter

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Dear Mount St. Helens Climber,

We contacted you two weeks ago in regards to a study being conducted by the Mount St. Helens Institute and Eastern Washington University. This is a reminder to please participate in this study to help the researchers gain a more clear understanding of you, the mountain climber. Your participation in this study is extremely valuable. If you have already completed the survey, please disregard.

This study has two purposes: (1) to identify characteristics of the climbers of Mount St. Helens, and (2) to determine the attitudes of the climbers of Mount St. Helens regarding to the Leave No Trace Principles.

You have been selected to participate in this study based on your registration to climb Mount St. Helens during the 2013 climbing season. Your response in this survey may aid researchers, the Mount St. Helens Institutes, and the U.S. Forest Service to better serve your needs. If you are under the age of 18, please do not fill out the survey.

This is a short survey and should take approximately 10 minutes to complete. Please click on the link below to access the survey website (or copy and paste the survey link into your Internet browser) to begin the survey. Please only fill out the survey one time.

Survey Link:

<https://docs.google.com/forms/d/1TDSJSHGo6QNwDGQqXnxo6PRI0xIxx6a7teBdZ-IqnaE/viewform>

Your participation in this survey is completely voluntary and your responses are submitted anonymously. No personally identifiable information will be requested. Your completed survey will be stored in a secure online format that only the researchers can view. If you have any concerns about your rights as a participant in this research or any complaints you wish to make, you may contact Ruth Galm, Human Protections Administrator at Eastern Washington University (509-359-7971/6567) [rgalm@ewu.edu](mailto:rgalm@ewu.edu)

It is through help from climbers like you that managers of this program can better serve your needs and preference. By completing this survey you will help the results of this study be more accurate, due to the assessment of a broad representation of mountain climbers such as yourself. If you do not wish to respond, please delete this email and thank you for your time.

Thank you for participating in this study and enjoy your time on Mount St. Helens! If you have any further questions or concerns, please feel free to contact the researcher at, [lparkers49@ewu.edu](mailto:lparkers49@ewu.edu) or 360-852-7381 or the Mount St. Helens Institute at 360-449-7883.

Sincerely,

Luke Parsons

Physical Education Health & Recreation Graduate Student/ Primary Investigator

[lp Parsons49@ewu.edu](mailto:lp Parsons49@ewu.edu)

360-852-7381

Dr. Matthew Chase

Director Physical Education Health & Recreation

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## VITA

Author: Luke William Parsons

Place of Birth: Vancouver, Washington

Undergraduate Schools Attended: Eastern Washington University

Degrees Awarded: Bachelor of Arts 2008

Honors and Awards: 2008 EWU Outdoor Program Student Mentor of the Year

2008 Student Life Dean's Award

Eastern Washington University, Graduate Assistant, Physical Education, Health, and Recreation Department, 2011-2013

2013 Physical Education, Health, and Recreation Graduate Student of the Year

Professional Experience: Instructor, Outward Bound, Southwest Program, Moab, Utah, 2008-2009

United States Forest Service, Climbing/ Wilderness Ranger, Mount St. Helens, Amboy, Washington, 2010- Present