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Interpretive trail guide for the Mount Baden-Powell trail hike to Lamel Spring

Amy Kathleen McConnell

INTERPRETIVE TRAIL GUIDE FOR THE MOUNT BADEN-POWELL TRAIL HIKE TO LAMEL SPRING

A Project

Presented to the

Faculty of

California State University,

San Bernardino

In Partial Fulfillment

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Master of Arts

in

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by

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ABSTRACT

This project aimed to effectively use interpretation as a form of non-formal environmental education. In order to do that, an interpretive trail guide was developed for the trail up Mt. Baden-Powell to Lamel Spring, a popular hiking trail in the San Gabriel Mountains of southern California. The theme-based trail guide emphasizes knowledge, awareness, and appreciation of the environment and natural history of the Mt. Baden-Powell area. It encourages people to take care of the area while enjoying it. In order to create an effective interpretive trail guide, the development of this project is based on a review of the literature and research into the history, geology, plants, and animals of the area. After completion of the trail guide a survey was conducted of hikers who used the trail guide to assess changes in knowledge, awareness, and appreciation of this environment. The results of the survey show that interpretation can in fact play an important role in environmental education.

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This project would never have been completed without the support and help of my patient husband and friends.

DEDICATION

To Ben and his friends who are growing up with a love and excitement for the natural world around us.

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CHAPTER ONE

INTRODUCTION

The four-mile-long Mt. Baden-Powell trail in the San Gabriel Mountains of Southern California is a popular hike visited by many people each year (USDA Forest Service, 2006). Visitors include people of all ages and abilities: novice hikers, seasoned hikers, backpackers, families with children from infants to teens, trail runners, Boy Scout groups, even nuns dressed in traditional attire.

The trail begins at about 6,500 feet elevation and climbs steadily to the 9,399 foot summit, a gain of 2,800 feet in elevation (USDA Forest Service, 2006). Many hikers attempt the eight-mile roundtrip to the summit (USDA Forest Service, 2006). Some visitors climb the mountain as a day hike, while others backpack in for the weekend. Many visitors are not attempting the summit at all but only going part-way up the trail. Regardless of how far visitors are planning to go up the trail, many of them are not accustomed to the elevation and experience some shortness of breath as they climb up the steep trail (USDA Forest Service, 2006). This results in hikers making frequent rest stops along the trail.

Having hiked the Mt. Baden-Powell trail many times myself, and having spent many rest stops contemplating the natural environment along the way, led me to believe that this trail could present not only an opportunity for its many visitors to enjoy a challenging hike but also an opportunity for them to gain knowledge and awareness about the area they are visiting.

Currently, there is no interpretive information available at the Mt. Baden-Powell trailhead or along the trail. For those visitors who do research before or after a hike some information about the trees, the history of the area, and the trail is available through the Forest Service (USDA Forest Service, 2006). Also, a trail plant list is available on the internet (Chester & Strong, 2003). However, to assist the site's many visitors in developing awareness, appreciation, and understanding of the area, there is a need for on-site environmental interpretation.

Environmental interpretation is a pleasurable and relevant way to communicate an organized theme-based message to an audience (Ham, 1992). According to Sharpe (1982), one of the major objectives of environmental interpretation is "to assist the visitor in developing a keener awareness, appreciation, and understanding of the

area he or she is visiting. Interpretation should help to make the visit a rich and enjoyable experience" (p.4). The interpretation must relate to the experience of the visitor (Tilden, 1957). Its goal is provocation and presentation of whole concepts (Regnier, Gross, Zimmerman, 1992; Tilden, 1957). Interpretation is one aspect of environmental education which takes place in a non-formal setting (Knapp, 2005). While non-formal education has not proven to change peoples' beliefs (Storksdieck, Ellenbogen & Heinlich, 2005), it can promote ecological knowledge (Knapp & Volk, 1997).

In order to facilitate interpretation of the Mount Baden-Powell trail, this project develops an interpretive trail guide which includes information to be read at rest stops along the trail up Mt. Baden-Powell. The theme-based trail guide emphasizes knowledge, awareness, and appreciation of the environment and natural history of the Mt. Baden-Powell area. It encourages people to take care of the area while enjoying it. A survey is conducted of hikers who have used the trail guide and hikers who have not used to the trail guide to assess differences and changes in knowledge, awareness, and appreciation of this environment. In order to create an effective interpretive

trail guide, the development of this project is based on a review of the literature.

CHAPTER TWO

REVIEW OF THE LITERATURE

Introduction

This literature review will examine the definition and goals of environmental interpretation. It will also define environmental education and look at the relationship between environmental education and interpretation, including using interpretation as a component of environmental education. Developing an effective interpretive program or display must take into account the educational theory supporting environmental interpretation and the qualities which make interpretation effective. Research in these areas is also included. The information and research reviewed here will be used to develop an effective interpretive trail guide for the Mt. Baden-Powell trail.

What Is Environmental Interpretation?

Environmental interpretation is a way of communicating the technical language of natural science into words and ideas which can be easily understood (Ham, 1992). It is a way of communicating ideas in a manner that is entertaining and interesting (Ham, 1992). "The goal is

to communicate a message—a message that answers the question 'so what' with regard to the factual information we've chosen to present" (Ham, 1992, p.4). Interpretation is informal education which aids visitors in learning environmental information (Knapp & Barrie, 1998).

Environmental interpretation has largely been supported and guided by Tilden's Six Principles of Interpretation (Ham, 1992; Knapp & Volk, 1997) originally stated in *Interpreting Our Heritage* (Tilden, 1957). Regnier, Gross & Zimmerman (1992) have restated Tilden's principles to say "interpretation should relate the subject to the audience, it should reveal information, not just impart facts, it should aim for provocation and for presentation of whole concepts, and it should be age-appropriate" (p.4). Awareness is achieved through firsthand experience where meanings and relationships are revealed (Tilden, 1957), which is a critical component of nature study (Knapp & Barrie, 1998).

Environmental interpretation has historically been used as an important way to help site visitors understand basic ecological and cultural information (Ballantyne, 1994; Knapp & Barrie, 1998), but interpretation is viewed as more than that. Aldridge (1972, as cited in Ballantyne, 1994) adds to the definition of environmental

interpretation by stating that it increases environmental awareness and stirs a desire for conservation. Ballantyne (1994) states the interpreter's aim is to "make an object or event meaningful to the visitor by communicating its significance and sense of place or time in a way which relates to the visitor's own experience and personal world" (p.112). In other words, engaging visitors through storytelling about the natural and cultural environment they are visiting leads to changes in knowledge, skills, attitudes, and behaviors (Ballantyne, 1994).

The field of interpretation has several important philosophical and objective statements (Knapp & Volk, 1997). In addition to Tilden's Principles of Interpretation (1957), Grant Sharpe (1982) has identified three major objectives for interpreting the environment. Sharpe's objectives are reflected in the objectives of the National Forest Service interpretive services program as well (Knapp & Volk, 1997). The National Forest Service (1990) objectives are to:

1. Provide customer service through orientation, information, and interpretation so that forest visitors will have a more enjoyable experience while developing a better appreciation and understanding of the area they are visiting.

2. Help solve management problems associated with visitor use of the National Forest System and its resources.
3. Enhance public understanding of Forest Service programs and activities.

Tilden viewed his work on the principles guiding interpretation as a work in progress (Beck & Cable, 2002).

In their recent book *Interpretation for the 21st century: Fifteen guiding principles for interpreting nature and culture* (2002), Larry Beck and Ted Cable have expanded on Tilden's six original principles. Their additional principles include: bringing the past alive by addressing the history of a place, knowing when enough is enough, interpreting beauty, supporting an optimal experience, and creating passion. Beck and Cable encourage others in the interpretive field to further expand on their ideas.

While the main goal of interpretation is essentially to communicate a message, these guiding principles and objectives have led to developmental goals of interpretation. These formal goals help in developing and evaluating effective interpretation.

Goals of Interpretation

In 1994, the Program Development Goals for Environmental Interpretation were developed (Knapp, 1994). This comprehensive set of objectives was synthesized from over 100 goals, principles, and objectives on interpretation. These research-based goals are organized into three categories that may lead to increased environmental behavior: entry level goals, ownership goals, and empowerment goals (Knapp & Barrie, 1998). According to D. Knapp and E. Barrie (1998):

> The most powerful use of these goals is to offer interpretive experiences that represent all three variable levels in a sequential hierarchical order. Although this may not assure attitude or behavior change in the visitor, it does offer opportunities to stimulate change. (p.25)

While research has not shown environmental interpretation to be effective at changing skills, attitudes, and behaviors (Knapp & Barrie, 1998), many interpreters consider that part of their goal (Ham & Krumpe, 1996; Knapp, 1994). Some interpreters view their goal as interpreting controversial events and issues (Knapp & Barrie, 1998; National Park Service, 1992). In fact the ultimate goal of many interpreters may be to

produce "an environmentally responsible individual" (Knapp & Barrie 1998).

To better understand how environmental interpretation can be effective, it is important to look at where interpretation fits into the broader field of environmental education (Knapp, 2005).

What Is Environmental Education?

Environmental education is a process which aims to develop three main goals (Stapp, 1969; Tbilisi, 1977): students will gain knowledge about the environment and its problems, they will become aware of ways to solve these problems, and they will become motivated to work toward a solution to these problems (Stapp, 1969).

Environmental education has a clear set of established development goals, objectives, and guiding principles which were set forth in the Tbilisi Declaration in 1977 (Knapp, 2005; Tbilisi, 1977). The categories of environmental education objectives as stated in the Tbilisi Declaration (Tbilisi, 1977) are:

> Awareness: to help social groups and individuals acquire an awareness and sensitivity to the total environment and its allied problems.

Knowledge: to help social groups and individuals gain a variety of experience in, and acquire a basic understanding of, the environment and its associated problems.

Attitudes: to help social groups and individuals acquire a set of values and feelings of concern for the environment and the motivation for actively participating in environmental improvement and protection.

Skills: to help social groups and individuals acquire the skills for identifying and solving environmental problems.

Participation: to provide social groups and individuals with an opportunity to be actively involved at all levels in working toward resolution of environmental problems. (p.15)

These goals have been used for curriculum development (Culen, 2005), and research has clearly shown that the ultimate goal, citizenship behavior, can be developed using environmental education (Hungerford & Volk, 1990).

The Cross-Section of Environmental Education and Environmental Interpretation

Environmental education and environmental interpretation share a similar mission (Knapp, 2005). Both fields strive to develop an environmental ethic (Ballantyne, 1994; Knapp, 2005). However, while connected, the two fields each have their own unique characteristics (Knapp, 2005). These differing characteristics are important considerations in the development, implementation, and evaluation of interpretive programs (Ballantyne, 1994). Environmental education and environmental interpretation differ in their structure and developmental goals (Knapp, 2005).

Differences in Structure

Environmental education tends to be structured toward school-based audiences (Ham & Krumpe, 1996). This formal type of education usually requires students to participate in a sequential curriculum (Knapp, 2005). Typically, students must pay attention in order to pass tests and get good grades (Ham & Krumpe, 1996). However, in environmental education, students are "encouraged to discover, investigate, and formulate principles and concepts for themselves" (Ballantyne, 1994, p. 113). The curriculum is taught over an extended period of time

allowing students much more involvement with the curriculum (Knapp, 2005).

Environmental interpretation, on the other hand, usually occurs in an informal or non-formal recreational setting (Knapp, 2005). The audience is voluntary and non-captive (Ham & Krumpe, 1996; Knapp, 2005). The participants freely choose to pay attention or not with no threat of punishment or loss of reward. They choose how long they will pay attention, and also to what extent they will be involved (Ham & Krumpe, 1996). At most, interpretive experiences may last from two hours to a half a day (Knapp, 2005). Many exhibits may be viewed for only a few seconds (Ballantyne, 1994). In short, this free-choice environmental education allows visitors to choose to participate or not, and also to choose what they will take away from their experience (Storksdieck, Ellenbogen, & Heimlich, 2005).

Differences in Development Goals

Environmental education has a clear set of established development goals (Knapp, 2005; Tbilisi, 1977). Research has clearly shown that the highest level goal, participation or action, can be effectively developed using environmental education (Hungerford & Volk, 1990).

Environmental interpretation also has established goals (Knapp & Volk, 1997), objectives (Sharpe, 1982), and principles (Beck & Cable, 2002; Tilden, 1957). Although this has not led to a road map that helps to develop higher level goals, such as attitude and behavior changes, as it has in environmental education (Knapp, 2005). Research has shown that interpretive programs can have an impact on site-specific behaviors (Knapp & Barrie, 1998).

However, research showing achievement of the higher level goals (attitude and behavior changes) has been weak or mixed in non-formal settings (Knapp & Barrie, 1998; Storksdieck, Ellenbogen, & Heimlich, 2005; Young & Witter, 1994). While interpretation may not achieve the highest level goals of environmental education, clearly it is an important aspect of the field (Knapp, 2005).

Using Interpretation as a Component of Environmental Education

While site-based interpretation is not the same as teaching or instruction in a formal setting (Ham & Krumpe, 1996), teachers are increasingly using informal interpretive experiences as an important part of their efforts to build environmental literacy (Ballantyne, 1994). This has many benefits: learning takes place through first-hand experiences rather than in the

classroom, students have the opportunity to apply skills in investigation and observation, and they undertake real problem solving and decision making in relation to environmental issues (Ballantyne, 1994). Research and conventional wisdom have shown that first-hand experience leads to better learning (Ballantyne, 1994).

Interpretive displays are often primarily designed for a non-captive, recreational audience and may not meet the needs of students and teachers (Ballantyne, 1994). It may be valuable for interpreters to consider modifications. They may think about evaluating and altering displays in order to be of more use to and attract more formal education audiences (Ballantyne, 1994).

Whether an interpretive program is designed for use with formal or non-formal audiences, it can play an important role in building environmental literacy (Ballantyne, 1994). In order to accomplish this, the fundamental principles of learning theory must be addressed (Knapp & Volk, 1997).

Learning Theory and Interpretation

To achieve the desired goals and to help evaluate effectiveness, interpretive programs must be based on established learning theory (Knapp & Volk, 1997). Several learning theories are addressed in the current research and applied to the goals of interpretation. These perspectives on learning include theories of learning in environmental education, learning in informal settings such as museums, nature centers, and interpretive programs, and theories which support behavior and attitude change (Brody, 2005; Ham & Krumpe, 1996; Knapp & Barrie, 1998).

Learning in Environmental Education

In his theory of learning in nature, Michael Brody (2005) attempts to explain how people learn in natural settings. Based on empirical research, he finds that people do not all learn spontaneously from nature and that "much of what we would like learners to learn is not obvious or commonsense" (Brody, 2005, p. 604). He states that environmental education, like other learning, is centered on the notion that meaningful learning takes place in specific 'real-world' situations in which knowledge is personally constructed based on learners'

previously held conceptions (Brody, 2005). Personal, social, and physical contexts all play a role in the learning (Brody, 2005). Prior conceptions help to form an association with new knowledge to increase understanding and lead to a "change in the meaning of experience for the learner" (Brody, 2005, p. 605).

Learning in Informal Settings

The important role of prior knowledge in learning is also one of the major themes in learning in informal settings such as museums, nature centers, and interpretive experiences (Brody, 2005). Prior knowledge fosters understanding in a situation where people have the opportunity to investigate, discover new information, and link it to their everyday lives (Brody, 2005). Social and physical contexts are also important. The social aspect is important because knowledge develops as a result of communication which provides opportunities for learners to link new ideas to past experiences and develop a shared understanding of an experience (Brody, 2005). In a physical context, learning seems to be linked to the environment in which it occurs but can be generalized to new situations (Brody, 2005).

Learning Affecting Behavior and Attitude Change

The main theories used to connect behavior and attitude change with learning through interpretation are Fishbein's Theories of Reasoned Action and Planned Behavior (Ham & Krumpe, 1996; Knapp & Barrie, 1998). Fishbein's theories have been used to provide a structure for a learning model which looks at interpretation as a form of persuasive communication (Knapp & Barrie, 1998).

Fishbein's theory (1986, as cited in Ham & Krumpe, 1996) suggests that behavior is guided by intention. Intention results from: 1) personal attitudes which are formed by beliefs and perceived outcomes of behavior, 2) subjective norms which are formed by the beliefs a person has about what significant others will think, and 3) beliefs that a person has the necessary knowledge, ability, skill, and resources to control the behavior (Ham & Krumpe, 1996). These three areas, in turn, are influenced by primary beliefs a person holds about behavior, social norms, and control. In order to change behavior, first primary beliefs affecting current behavior must be changed which can lead to changes in attitudes, subjective norms, and behavioral control. These factors, in turn, may change a person's intentions which may (if

there are not intervening factors) change the behavior (Ham & Krumpe, 1996).

According to the model based on Fishbein's theory, in order for an interpretive program to affect behavior it is first necessary to address the attitudinal, subjective norm, and behavioral beliefs which the target audience holds in relation to the desired behavior (Ham & Krumpe, 1996). These beliefs need to be identified and addressed through theme-based communication in order to be changed (Ham & Krumpe, 1996). "By nature, communication that develops a theme advocates a belief" (Ham & Krumpe, 1996, p. 18). This model seems to be theoretically sound and is frequently cited, although there is not yet substantial research supporting it (Knapp & Barrie, 1998).

In summary, looking at the theories which support learning in interpretation helps guide its development. Different theories support different levels of goals. The highest goal levels, those of attitude and behavior change, may be achieved by working to change visitors' beliefs through the use of communication based on a theme (Ham & Krumpe, 1996). Basing interpretation on a theme is one of the most important qualities in making interpretation effective (Ham, 1992; Ham & Krumpe, 1996). In order to be effective and achieve its goals,

environmental interpretation must have qualities which make it meaningful and understandable (Ham & Krumpe, 1996).

Qualities of Effective Interpretation

Three important questions must be answered in designing an effective interpretative program or display:

1. Who will be the target audience (Ballantyne, 1994; Ham & Krumpe, 1996; Rideout & Legg, 2000),
2. What should be interpreted when you may only have the attention of the visitor for a short time (Ham, 1992; Knapp & Barrie, 1998) and,
3. How can you attract the visitor's attention and hold it long enough to get your message across (Ham, 1992).

Know the Audience

Since most interpretive displays and programs will be aimed at a wide and varied audience, it is important to consider several aspects of the intended audience in order to make the information accessible to all. These aspects include: age (Ballantyne, 1994), ethnicity (Rideout & Legg, 2000), and beliefs (Ham & Krumpe, 1996).

Ballantyne (1994) states that "adults and children do not perceive the world in the same way and interpretive

learning experiences aimed at adults may not achieve the intended effect with young students" (p. 115). Tilden (1957) also suggested that children learn in a fundamentally different way and require a different approach in interpretation. It is important to know if a site's visitors will be primarily adults, families, or both.

In their research on minorities and interpretive programs, Rideout and Legg (2000) found that a culturally diverse population may have different needs and desires from interpretive programming. Interpreters need to understand that potential cultural boundaries, both perceived and real, exist which prevent programs from being equally accessible to different cultural and ethnic groups (Rideout & Legg, 2000). They should ask themselves, "Do existing programs and personnel foster intercultural boundary maintenance, or do they encourage diversity?" (Rideout & Legg, 2000, p. 55). An effective program or display will encourage diversity.

Another important consideration in knowing the target audience is to understand beliefs which they may hold. Ham and Krumpe (1996) state that for interpretation to influence visitors' behavior it is important to identify the salient beliefs which are influencing their behavior

in a particular situation. In order to influence those beliefs, it is most important to develop the interpretive program around a theme (Ham & Krumpe, 1996). Ham & Krumpe (1996) state that, "A well-articulated theme expresses a belief about a thing, whether it be a behavior, event, person, or object. By nature, communication that develops a theme advocates a belief" (p. 18).

In other words, to influence the visitor's behavior it is necessary to understand their belief and help them to understand the interpreter's belief. This can be accomplished by presenting information through a theme.

What Information Will Be Interpreted?

It is most important to have a unified theme when deciding what information will be communicated in an interpretive display or program (Ham, 1992; Ham & Krumpe, 1996; Trapp, Gross, & Zimmerman, 1991). Ham (1992) defines the theme as "the main point or message the communicator is trying to convey about the topic" (p. 21). In choosing the theme, the interpreter should be able to say, "After people have completed this trail I'd like them to know that... (or appreciate that..., or think that...)" (Ham, 1992, p. 331). The theme should reveal the importance of the site and what it means (Trapp, Gross, & Zimmerman,

1991). It is the main message the interpreter is trying to convey (Ham, 1992).

In order to make the entire display or program unified, each piece of information included in the display or program should fit within the chosen theme (Trapp, Gross, & Zimmerman, 1991). All of the information should be organized to fit together like the parts of a story, with a beginning, middle, and end (Ham, 1992; Tilden, 1957).

Attracting and Holding the Visitor's Attention

In addition to having a theme, an effective interpretive program or display must attract and hold the visitor's attention (Ham, 1992). In order to do that, effective interpretation must be:

- meaningful and personal (Ham, 1992),
- pleasurable (Ham, 1992),
- closely associated with the experience of the visitor at the site (Ham, 1992; Trapp, Gross, & Zimmerman, 1991),
- related to concrete objects and experiences (Trapp, Gross, & Zimmerman, 1991),
- short and concise (Trapp, Gross, & Zimmerman, 1991),

- able to help the visitor experience the site (Trapp, Gross, & Zimmerman, 1991).

Interpretation should add to, and not detract from, the site and the visitor's experience there (Trapp, Gross, & Zimmerman, 1991).

In order to hold the audience's attention, interpretation must also be both interesting and understandable (Young & Whitter, 1994). In their research on interpretive brochures, Young and Whitter (1994) found the characteristics of story line, mystery, vividness, and motivating information were all important in developing interesting, effective brochures. The sense of a story being followed, along with the anticipation of what is coming next in the story, holds the attention of the audience (Ham, 1992; Young & Whitter, 1994).

To make the information understandable, Young and Whitter (1994) found that it was important to use what they called 'chunking'. Ham (1992) describes this same idea as helping "people learn big ideas (like themes) by combining smaller ideas (like main points and subordinate information)" (p. 27). Ham (1992) recommends that the main ideas within the theme should be kept to five or fewer and should be organized so that "the audience can easily distinguish between those main ideas and the

subordinate information" (p. 21). Organizing the information so that it is interesting and understandable helps to keep the attention of the non-captive audience.

An effective interpretive program is developed through careful planning and design. Consideration must be given to who the interpretation will be directed at, what will be interpreted given that there is a limited amount of time, and how it will capture and hold the attention of a non-captive audience.

Summary

In summary, the key goal of environmental interpretation is to offer interpretive experiences which represent the variable levels of environmental education: awareness, knowledge, attitudes, skills, and participation. This is the best way to offer opportunities which may stimulate change in visitors (Knapp & Barrie, 1998). An interpretive program whether formal or non-formal can play an important role in building environmental literacy (Ballantyne, 1994) and may help produce an environmentally responsible individual (Knapp & Barrie, 1998).

To be effective, interpretation must be based on a unified theme and attract and hold the visitor's

attention. It should add to, and not detract from, the site and the visitor's experience there (Trapp, Gross, & Zimmerman, 1991). Effective interpretation must be pleasurable, meaningful and personal (Ham, 1992), related to the visitor's concrete experiences (Ham, 1992; Trapp, Gross, & Zimmerman, 1991), and short and concise (Trapp, Gross, & Zimmerman, 1991). Organizing the information so that it is interesting and understandable helps to keep the attention of the non-captive audience. All of the information should tell the story of the place (Ham, 1992; Tilden, 1957).

The information reviewed here will be used next to develop an effective interpretive trail guide for the Mt. Baden-Powell trail.

CHAPTER THREE

METHODOLOGY

Introduction

The goal of this project is to effectively tell the story of the Mount Baden-Powell area through interpretation which should increase visitors' knowledge, awareness, and appreciation of the area. There were three main phases of development for this project: the preliminary research, the development of the trail guide, and a survey of hikers to determine the effectiveness of the trail guide.

Phase One: Preliminary Research

The first phase of developing the project included reviewing the current literature in the field of interpretation and its intersection with environmental education as discussed in Chapter Two, Review of the Literature. In addition, this phase included examining the location, accessibility, and visitor demographics for the area, investigating the suitability of the site and local trails, and an evaluation of existing interpretive trails and other opportunities in the area.

Location and Access

Mount Baden-Powell is located about eight miles west of the small town of Wrightwood, California, population 4,200 (US Census Bureau). It is within easy driving distance of the Los Angeles metropolitan area via State Highway 2. Parking is available at the Vincent Gap trailhead parking lot. The area has year-round visitor access except when there is an especially heavy snowfall. The trails in the area, and especially the Mount Baden-Powell trail itself, have limited access during winter months because of ice and snow.

Visitor Demographics

The Mount Baden-Powell area has many visitors. It has easy access and close proximity to the Los Angeles-Riverside-Orange County metropolitan area with an area population of approximately 16.5 million people (US Census Bureau). Exact visitor statistics are not available for the area or the trails. Frequent observations over the past ten years reveal great variation in age, hiking experience, and objectives of visitors to this area. Visitors observed include people of all ages and abilities: novice hikers, seasoned hikers, backpackers, families with children, Boy Scout groups, high school and college cross country running teams, and even nuns dressed

in traditional attire. In recent years there has been a marked increase in observations of people running the trail to the top of Mount Baden-Powell and back. For many visitors it is their first time in the area, but others have returned dozens of times or more.

Description of Local Trails

There are several trails in the immediate area of Mount Baden-Powell. They all begin at or near the Vincent Gap parking lot. The Mount Baden-Powell trail itself heads west from Vincent Gap. It is four miles to the summit of the 9,399' mountain. Most of this trail is part of the Pacific Crest Trail which runs from Mexico to Canada. The Pacific Crest Trail can also be followed to the east from Vincent Gap toward Grassy Hollow Visitor Center (about five miles by trail). Access to the trail heading east is across the road from the main parking area and is not obvious.

The Mine Gulch trail leads from Vincent Gap around the east flank of Mount Baden-Powell. It is a relatively level dirt road with some rocky stretches. Two steep gully sections have been washed out and are now steep, rocky, and narrow trail sections. This trail is also four miles long, ending at the Bighorn Mine. The Mine Gulch trail is clearly indicated by a sign at the trailhead, and

it has many hikers. About 200 yards down the Mine Gulch road another trail descends to the East Fork of the San Gabriel River.

The Manzanita trail descends from Vincent Gap approximately 5.5 miles to Big Rock creek. The access to this trail is unsigned and is located across the road from the main parking area.

Choosing the Mount Baden-Powell Trail for Interpretation

The trail up Mount Baden-Powell was chosen from among the other area trails for interpretation for a variety of reasons. A majority of the people who come to Vincent Gap hike either the Mount Baden-Powell trail or the Mine Gulch trail. The starting points of both of these trails are clearly marked, whereas the starting points of the other trails are less obvious. The effects of a high number of visitors can be observed on both of these trails and in the parking lot: trash, graffiti, vandalism of signs and restrooms, and erosion caused by hikers and runners cutting switchbacks on the trail are problems which have been personally observed. Interpretation could ideally be designed to help improve visitor impact.

The trail up Mount Baden-Powell also has pre-existing landmarks which made it more usable for the type of self-

guided trail guide proposed. The Mine Gulch trail, while more level and wider, does not have clear landmarks along the way, which does not make it a prime site for this project.

There are some drawbacks to designing an interpretive guide for the trail up Mount Baden-Powell. The main drawback is that the trail, although not steep, is generally uphill. This may be less appealing to some novice hikers or those with small children. The fact that the trail is uphill was incorporated into the trail guide. The stops give hikers a reason to take brief rests on the way up. Another drawback is that many hikers are intent on reaching the summit or running the trail, and therefore, less likely to be interested in learning along the way.

The trail is also a linear, out and back, trail. This is slightly less desirable than a loop trail for interpretation (Ham, 1992). The trail is also longer than the typical interpretive trail. According to Ham (1992), an interpretive trail is best if less than one mile long, a distance most effective for maintaining a person's interest in an interpretive activity. For this reason a stopping point at Lamel Spring, at 1.6 miles from the trailhead, was chosen for the end of the interpreted

section of this trail. Lamel Spring provides an interesting destination for hikers who do not want to hike the whole trail. But, being a linear trail which is downhill on the way back makes it easy for people to return at whatever point they are ready.

Analysis of Existing Interpretation in the Area

An early step in researching this project was to assess what interpretive materials are already available in the area, how well they work, their condition, and their accessibility. Interpretive opportunities exist at the Grassy Hollow Visitor Center, on various other nature trails, and at one signed point along the highway.

The primary local source of interpretive materials is the Grassy Hollow Visitor Center, located about two miles east of the Mount Baden-Powell trailhead on Highway 2. The visitor center is open only on weekends throughout the year and is staffed by members of Volunteers of the Angeles Forest. Displays on local animals, plants, geology, and forest management are available inside the center during their open hours. Some Saturday programs are provided on a variety of subjects during the summer months both at the visitor center and other local locations.

A loop hike on the Pacific Crest Trail starting very near Grassy Hollow Visitor Center provides an ideal location for an interpretive trail. This was, in fact, the first choice for this project. However, a trail is currently under development there by one of the volunteers and should be available soon.

The following trails are developed nature trails all within about 10 miles of Vincent Gap. The information here is a result of hiking the trails, interviews with local Forest Service employees and volunteers, and the existing trail guides.

1. Big Pines Self-guided Nature Trail
    a. Type of trail: signed posts
    b. Theme: Plants, animals and native people exist together.
    c. Length: 0.5 mile
    d. Located behind Big Pines Ranger station.
    e. Conditions: Trail is in good condition, but with limited access due to ongoing construction at the trail entrance for the past several years. It is possible to access the trail by walking around to the back of the Forest Service building, but no signs show how to get to the trail or that it exists. All interpretive signs on the trail are

currently in place and in readable condition. However, due to recent fires some of the plants listed on the signs are no longer there. This trail was designed in the 1970's by Doug Milburn of the Forest Service. During an interview he stated he would like to see the trail changed and updated to focus more on the recent human history of the area, including use by the LA County Parks in the 1930's.

2. Table Mountain Self-guided Nature Trail
   a. Type of trail: Brochure and 12 numbered posts
   b. Theme: "Many forms of life make up a forest where plants and animals live together. Their survival depends upon interaction with each other". Not all points follow the theme.
   c. Length: 0.5 mile
   d. Condition: The trail is in fair condition. All of the numbered posts are in place. There is one confusing turn where it is easy to lose the nature trail entirely. There is a metal trail guide box at the beginning of the trail for brochures, but it rarely is stocked. Brochures were located at Big Pines Ranger Station.

e. The brochure is provided by the Friends of the Angeles National Forest. It is not clear if the trail was designed by volunteers or by the Forest Service. The latest update was 7/2003.

3. Lightning Ridge Self-guided Nature Trail
   a. Type of trail: Brochure and 14 numbered posts
   b. Theme: "Highlights examples of the harsh and often violent forces of nature. But nature has its delicate side as well and it needs our assistance".
   c. Length: 0.6 mile loop
   d. Condition: The trail is in good condition. Most or all of the numbered posts were in place on various hikes. Volunteers from Grassy Hollow Visitor Center lead interpretive hikes on this trail several times during the summer. There is a metal trail guide box at the beginning of this trail for brochures, but it is usually empty. No brochures could be found at Grassy Hollow. The only brochures located were at Big Pines Ranger Station.

4. Jackson Flats Self-guided Geology Trail
   a. Type of trail: Placards on posts

b. Theme: Examples of many geologic features and activity can be found in this area.

c. Length: 0.75 mile loop

d. Condition: Although a bit overgrown, this trail is in good condition. All signs are in place and readable. However, this trail is located at Jackson Flats Group Campground which is behind a locked gate. Unless camping at Jackson Flats there is a one mile hike to get to this trail.

5. Jackson Flats Self-guided Forest Management Trail

a. Type of trail: Placards on posts

b. Theme: Unclear. The existing signs all related to management of the forest by people.

c. Length: 0.5 mile loop

d. Condition: While the actual trail is in good condition, only a few interpretive signs remain and few of those are readable. This trail is also located at Jackson Flats Group Campground accessible only to campers or with a one mile hike in.

6. Blue Ridge Trail Self-guided Nature Trail

a. Type of trail: Brochure and 15 numbered posts

b. Theme: "Many kinds of plants, shrubs, and trees make up a forest".

c. The purpose of the trail as stated in the brochure is to "learn more about the environment of your National Forest". Most of the paragraphs have to do with different plants; not all points follow the theme.

d. Length: 2 miles

e. Conditions: The nature trail here is essentially non-existent, although the trail itself is frequently used by hikers and mountain bicyclists. The numbered posts were removed after a snow player was injured by colliding with one. The brochure is not available. Like the Mount Baden-Powell trail, this is a linear trail which is mostly uphill.

f. Designed in 1977 by the Forest Service.

There is also an interpretive road sign located at Inspiration Point, across the road from the Lightning Ridge trail and about four miles before the Mount Baden-Powell trailhead. Mount Baden-Powell is an impressive sight from this viewpoint. This engraved metal sign points out the names of the visible peaks and drainages with elevations, and gives some information about the history of Mount Baden-Powell.

Gathering this background information developed a strong base of knowledge on which to develop the actual trail guide.

Phase Two: Development of the Trail Guide

The second phase of the project was the development of the trail guide itself. In order to ensure the effectiveness of the trail guide, it was based on current information from the field of interpretation. The trail guide was developed over the course of several months, but is based on ten years of experience hiking in the area as well as research into the local history, geology, animals, and plants. Development of the trail guide incorporated feedback from other hikers and field testing.

Determining the Format for Interpretation

Several options were considered in deciding on the format in which to present the interpretive material. Initially, a large wooden sign at the Vincent Gap parking lot was investigated for presenting a stationary interpretive exhibit. This 4' x 8' sign is occasionally used for Forest Service posters or flyers. However, because of the possibility of vandalism, this idea was not practical (Sharp, 1982).

A series of informational placards placed along the trail was considered next. However, any permanent signs require Forest Service approval. Based on a discussion with Doug Milburn of the Forest Service and the experience of the Pasadena Audubon Society (Garret, 2008) getting this approval can be frustrating and lengthy. For this reason, numbered markers along the trail with an accompanying brochure trail guide did not seem practical either, as it would require Forest Service approval before installing the markers.

The format finally chosen is a take-along trail guide brochure which relies only on existing landmarks for the stopping points along the way. This type of format has several advantages and drawbacks (Ham, 1992, p.312). Advantages are that it is relatively inexpensive to produce, seems to be easy to use, and is effective. Drawbacks are that it may cost more to reproduce in the long run and that it relies on one person who reads the information while others listen passively. Eventually it is hoped to have the trail guide brochure available for purchase at Grassy Hollow Visitor Center, to help cover the cost of printing. With a general idea of the format, the next step was to decide on the story to tell.

Developing a Theme

Effective interpretation is based on a theme and tells the story of a place (Ham, 1992; Beck & Cable, 2002). Much thought, hiking, reading, and consultation with other hikers went into the development of the theme for this trail guide.

The story of Mount Baden-Powell is in part its history and in part what is there today. The history and human history of the mountain are well told by John Robinson in two of his books *The San Gabriels* and *Trails of the Angeles 100 Hikes in the San Gabriels*. The plants and geology of the area are described briefly by Robinson and more in depth by Tom Chester in his online book and website, *Field Guide to the San Gabriel Mountains*, and *Hikes in the Gabriel Mountains*. Using information from these sources, other locally available interpretive materials, as well as ideas from fellow hikers, the theme for the interpretive trail in this project was developed and refined.

The theme of the trail guide gradually evolved into the idea that knowing something about a place ties us to that place. Being tied to a place by our knowledge and experience helps us to grow and to appreciate and value that place. This was further refined and incorporated

into the introduction paragraph of the trail guide which reads:

> By learning and understanding a little about the plants, animals, rocks and history of this mountain, we also become a part of the mountain. Knowing something about a place ties us to that place. From the moment you set foot here, you too are part of this environment, part of the Baden-Powell natural and human history (see Appendix A).

Designing the Stops Along the Trail

The next step was to decide on the key points which support the theme and would be included on the trail guide at the stops along the trail. Ham states that each stop should: 1) focus the audience's attention on the feature, 2) explain the significance of the feature, and 3) connect the explanation to the theme (Ham, 1992, pg.325). Because of the design of this trail guide, the audience must actually be looking for the feature ahead of time, so they are already focused on the feature.

Once the theme was developed and refined the significance of each feature was also very straightforward. Each landmark is a feature which makes up part of the story of Mount Baden-Powell. Explicitly connecting the explanation to the theme was possible for

most of the sites, although limited space for writing was a major factor in determining what exact information to include. This did, however, make it easy to keep writing short and concise which is also important (Ham, 1992; Beck & Cable, 2002).

There is disagreement about how many stops an interpretive trail should have (Ham, 1992). Fortunately, for this purpose of this project, the decisions for the number and location of stops were very straightforward. Stops had to be where there were easily identifiable, permanent landmarks.

Nine landmarks were chosen as stops. Seven of these are very clear: the trailhead, a split rail fence section, two Boy Scout/Pacific Crest Trail markers, a bench, a large boulder with a flat face right alongside the trail, and Lamel Spring. All but one of these landmarks is also located at the end of a switchback. Two of the landmarks are not as obvious as the others. Number six, a dead tree with lichen, could be one of several trees along the trail although this particular tree is more prominent and is located at the end of a switchback. Number seven, an example of erosion and trail cuts, is one of several examples which can be seen along the trail.

In order to help hikers find the landmark stops along

the trail and know what information went with each stop, the trail guide was designed in a map format. This made the trail easier to follow and interpret, but it also imposed strict limits on how much writing could be included about each stop.

Designing the Plant Guide

In addition to the stops, incorporating a way to identify native plants was also important. Awareness of the native plants is a key part of the theme. Plants were identified and cross-checked using several guidebooks to local flora (Havert & Gray, 1996; San Bernardino Mountains Land Trust, 1999), as well as Tom Chester's Plant Guide to Mount Baden-Powell and Lamel Spring (Chester & Strong, 2002-2003).

Initially, several prominent plants were listed which could be found at each of the stops along the trail. However, that seemed to make the stops too time consuming and took away from the idea of a gradual change in species as the elevation of the trail changes.

Eventually, the idea developed to note the names of plants on the map in general places where they can be found, since almost all of the species can be found in more than one place along the trail. A description with photographs of each species is on the back of the trail

guide. Each species is marked with a small icon which shows a distinguishing feature of that plant (i.e. flower color, berries, or cones/acorns depending on the type of plant). This helps with plant identification and with locating the plant description on the back of the trail guide.

The plant descriptions on the back of the trail guide include the plant name, botanical name, a brief description which includes, in most cases, a short idea to tie the plant to the theme, and a photograph showing the prominent feature of the plant for identification. The number of plants included was limited by space as photographs must be large enough to actually see and help identify the plant. The photographs were taken throughout the summer months to show plants in bloom in most cases.

Twenty different plants were included in the final trail guide. Most of these plants are found in the first 1.6 miles of the trail, up to and at Lamel Spring. This area has the greatest diversity of plant species. However, the Lodgepole Pine and Limber Pine were also included on the trail guide because of their significance in demonstrating the change in species with the increase in elevation. These are the dominant species as the trail nears the summit. The extraordinary Limber Pines in this

area are estimated to be 1,500 to 2,000 years old (Robinson, 1984). While a great attempt was made to include the most eye-catching plants, several interesting species had to be left off because of the limited space.

Including Animals on the Trail Guide

Native animals are also a key part of the theme to the trail guide, but they proved much more difficult to incorporate. There are not sites along the trail where animals, birds, or even obvious animal signs can be consistently found with the exception of hummingbirds near certain flowers. Also with the limited space on the trail guide there was not enough room for photographs or descriptions of animals. Stop number five does discuss the Nelson Bighorn sheep which live in the area.

In order to help visitors learn more about the local animals and birds a text box was included on the back of the trail guide indicating that more information and examples of local animals and birds are available at Grassy Hollow Visitor Center.

Feedback and Field Testing

As the trail guide neared completion, draft samples were presented to eight different hikers for feedback. These hikers had varying levels of hiking experience, from novice to expert, and varying knowledge of the Mount

Baden-Powell area, from first-time visitors to hikers who have visited the area over 50 times. Each person offered unique observations and asked questions which brought up important considerations. This feedback was instrumental in clarifying the trail guide and adding important features.

After many revisions, the field guide was field tested by two hikers with an intermediate level of hiking experience and limited knowledge of the Mount Baden-Powell area. They also offered a few minor suggestions which were incorporated in the final trail guide.

Production and Printing

The trail guide was produced using Microsoft Office Publisher. The actual trail map is based on the United States Geological Survey (USGS) topographical map, Crystal Lake quadrangle, but was drawn freehand and revised multiple times in the field. The final version was then scanned into Publisher. The inset topographical map is part of the Crystal Lake quadrangle downloaded from the USGS website. All photographs were taken using an Olympus 4.0 mega pixel camera with AF 3x zoom lens. Icons for the various plants are from Microsoft Office. The font used for the text of the introduction, stop descriptions, and plant descriptions is 9 point or 10 point Times New Roman.

Plant names on the map are in 12 point Rage Italic. The title font is 14 point Pooh. The final version of the map was printed in color with a laser printer on laser card stock. Once printed, the finished trail guide was ready for hikers to determine if it was effective.

Phase Three: Survey of Hikers

The third phase of the project was to design a survey and use it with hikers to determine if the finished trail guide is effective in accomplishing the goals of increasing knowledge, awareness, and appreciation of an area.

Creating the Survey

The survey was created to assess visitor knowledge, awareness and appreciation, as well as provide some demographic information. Questions 1 through 5 are multiple choice and true/false questions designed to assess visitors' knowledge. Answers to these five questions are contained in the trail guide and should be easily found while hiking with the guide. Questions 6, 7, 11, and 14 relate to visitors' awareness of the area and environment and are not directly answered by the trail guide. These questions are all of either a true/false or yes/no format. Questions 8 through 10 relate to the

visitor's appreciation of the area and their hiking experience. These questions are answered with a Lickert scale. Questions 12, 13, and 15 ask demographic information using both a free response and yes/no format.

The survey protocol was approved by the Institutional Review Board (IRB) of California State University, San Bernardino. The survey was not field tested before use. After several surveys were complete, it became apparent that some changes had to be made in the questions to better clarify the responses, and the survey had to be resubmitted to the IRB for approval.

Administering the Survey

Two groups of hikers were surveyed: 1) hikers who hiked the entire trail or a part of it with the trail guide and 2) hikers who hiked the trail without the trail guide. The survey collection period was from September 1, 2008 through October 8, 2008.

A total of 40 hikers were surveyed. Twenty hikers were surveyed who had hiked the trail with the trail guide (group one). Twenty hikers were surveyed who hiked in the area but did not use the trail guide (group two). Both groups received the same post-hike survey. Of the 20 hikers in group one, 13 were also given a pre-hike survey which is the same as the post-hike survey but with the

exclusion of question numbers 10 and 13 which relate specifically to the hike experience.

The initial idea was to recruit hikers for group one at the trailhead and have them complete a survey when they returned from hiking with the trail guide. However, this did not prove effective because of time constraints. As an alternative, trail guides were made available to a local Wrightwood-area hiking group, some hikers who were encountered on the trail during the creation of the trail guide and were interested in hiking with it, and a local Pilates exercise instructor who offered to make the trail guides available to her students. Therefore, hikers in group one were mostly local Wrightwood-area residents who volunteered to do the hike.

Hikers in group two were contacted at the trailhead when they were finishing a hike in the Mount Baden-Powell area. Since there did not need to be any contact with these hikers before they hiked, time was not an issue. Although information was not collected on where these hikers were from, a few of them identified themselves as local residents also.

Survey Data Analysis Procedure

Results of the surveys were put into an Excel spreadsheet for analysis. Results were compared between

group one and group two. Changes in knowledge, awareness, and appreciation were also analyzed for group one by comparing their pre- and post-hike surveys.

Summary

These three phases describe the development of the project from idea to final product. Knowing if the trail guide actually accomplished the stated goals requires an in-depth analysis of the results of the survey.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

Current literature in the field of interpretation indicates that theme-based interpretive displays can be effective in changing visitors' knowledge, awareness, and appreciation of an area (Ham, 1992; Knapp & Volk, 1997). The surveys were analyzed quantitatively to determine if change was effected by use of the trail guide. Results showed that knowledge was in fact increased through use of the trail guide, while awareness and appreciation of the area were much less affected. Qualitative analysis was also done based on comments from and discussions with hikers who used the trail guide. These findings helped to clarify the quantitative findings.

Findings for the Knowledge Goal

The questions which focused on knowledge were numbers one through five on the survey. These questions ask about human history, plants, formation of the mountain, and big horn sheep. Answers to these five questions are all found on the trail guide. To determine if there was a change in

visitor knowledge, the survey results were analyzed in two ways.

First, the two groups were compared with each other: those who hiked with the trail guide and those who had hiked in the area without a trail guide. Results show clearly that the group who had used the trail guide did have a higher level of knowledge after hiking than the group who had hiked without the trail guide.

Question number one asks about the historical uses of the area. While nearly all of the hikers who used the trail guide answered correctly, so did more than half of the group who did not use the trail guide. This information may be more generally known and also the correct response was "all of these" which may have led to more accurate guessing. Question number four had nearly all correct responses from both groups. This is a fairly general question about which factors contribute to the formation of the mountain and although the information is on the trail guide the question is probably too general to indicate a change in knowledge. Question number five is a true/false question asking if there are Bighorn Sheep in the area. With a 50% chance of getting the answer correct the results could be as much the result from guessing as actual knowledge. The results for questions two and three

show the largest range in responses between the two groups of hikers. Both of these multiple choice questions are about specific less-common plants. These questions most accurately show that knowledge did increase because of use of the trail guide. The survey results are shown below in Figure 1.

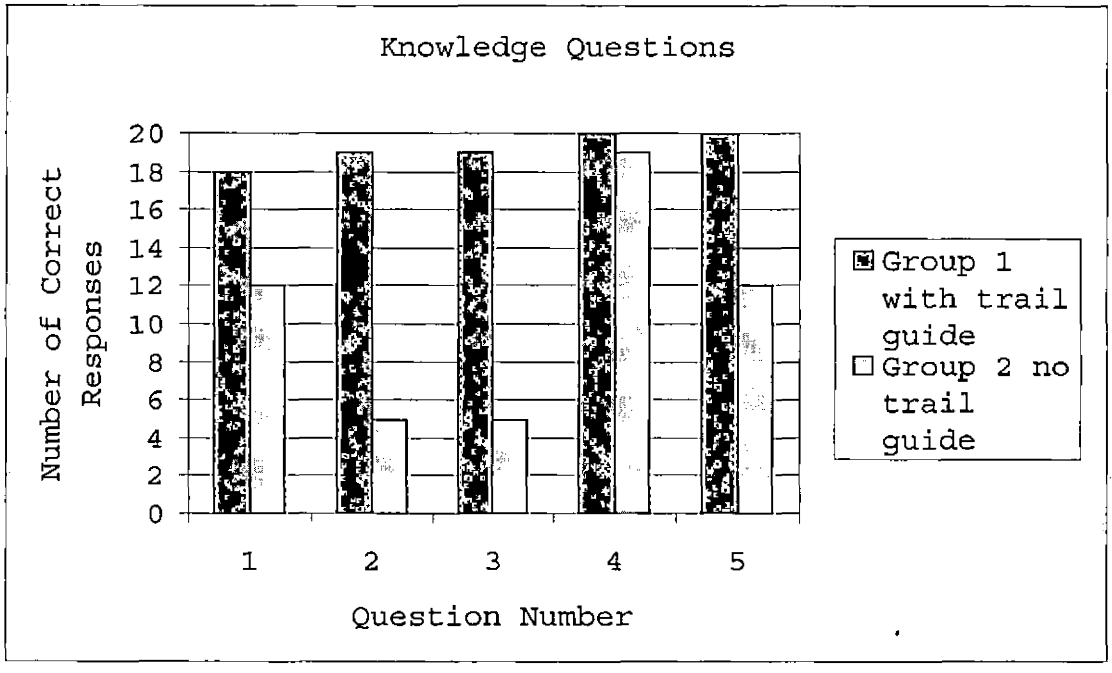


Figure 1. Analysis of responses to knowledge questions between hikers with the trail guide and hikers without the trail guide.

Second, the results were compared between the pre-hike and post-hike surveys for the group who hiked with

the trail guide. The results of this analysis, shown in Figure 2 below, also show that there was an increase in individual hiker's knowledge after hiking with the trail guide. Again, questions two and three show the most increase between the pre- and post-hike. Questions one, four, and five were answered correctly by nearly all hikers on the pre-hike survey. Question four was probably too general overall to indicate any change in knowledge. Questions one and five may have had a high number of correct responses initially because most of the hikers in this group reside in the local area and overall have had a greater number of hikes in the area. These hikers probably have more exposure to uses of the area and the existence of the Bighorn Sheep.

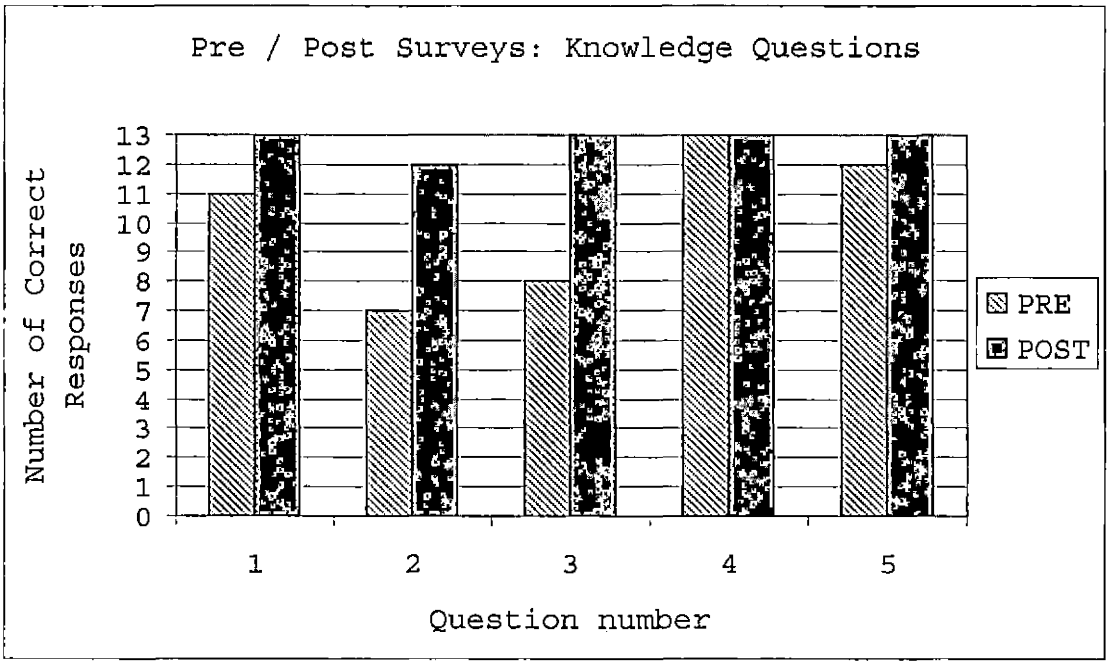


Figure 2. Analysis of responses to knowledge questions comparing pre-hike and post-hike surveys of hikers who used the trail guide.

Based on these findings it can be assumed that the trail guide was effective at increasing visitors' knowledge of this area.

Findings for the Awareness Goal

There are four questions on the survey which relate to visitor awareness of the area. These questions ask about staying on the established trail, if personal actions at home and at the trail affect the area, and if the visitor is aware of resources available at Grassy

Hollow Visitor Center. The results of the questions relating to awareness were analyzed in a similar way to the knowledge questions.

First, the two groups were compared with each other: those who hiked with the trail guide and those who had hiked in the area without a trail guide. Although there are some differences, results do not show any clear distinction between the two groups' levels of awareness of the area. The one question which did show a difference in awareness was the question about the availability of information at Grassy Hollow Visitor Center. Visitors who hiked with the trail guide were more likely to know about the information available at the visitor center. However, since many of the hikers in group one are from the local area it could be assumed that they held this knowledge already. The survey results are shown here in Figure 3.

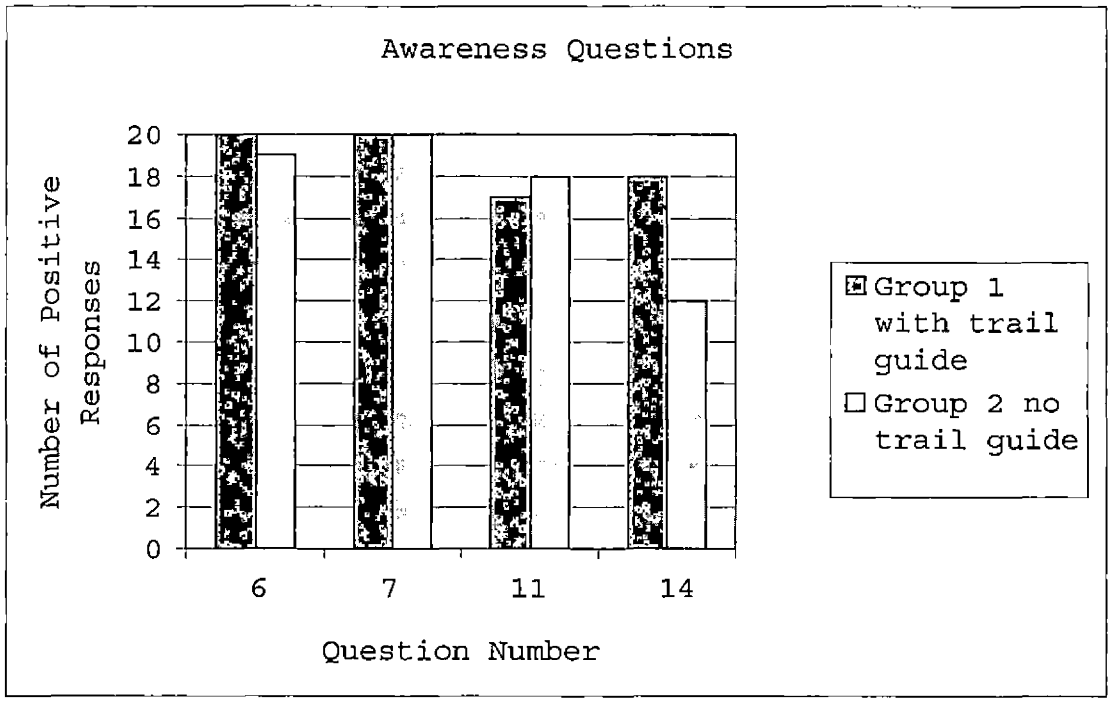


Figure 3. Analysis of responses to awareness questions between hikers with the trail guide and hikers without the trail guide.

Second, the results were again compared between the pre-hike and post-hike surveys for the group who hiked with the trail guide. The results of this analysis, shown in Figure 4 below, also do not show a large increase in individual hiker's awareness of the area after hiking with the trail guide. It should be noted however, that these hikers already had a strong awareness of the area before hiking as shown by the number of positive responses on the pre-hike survey.

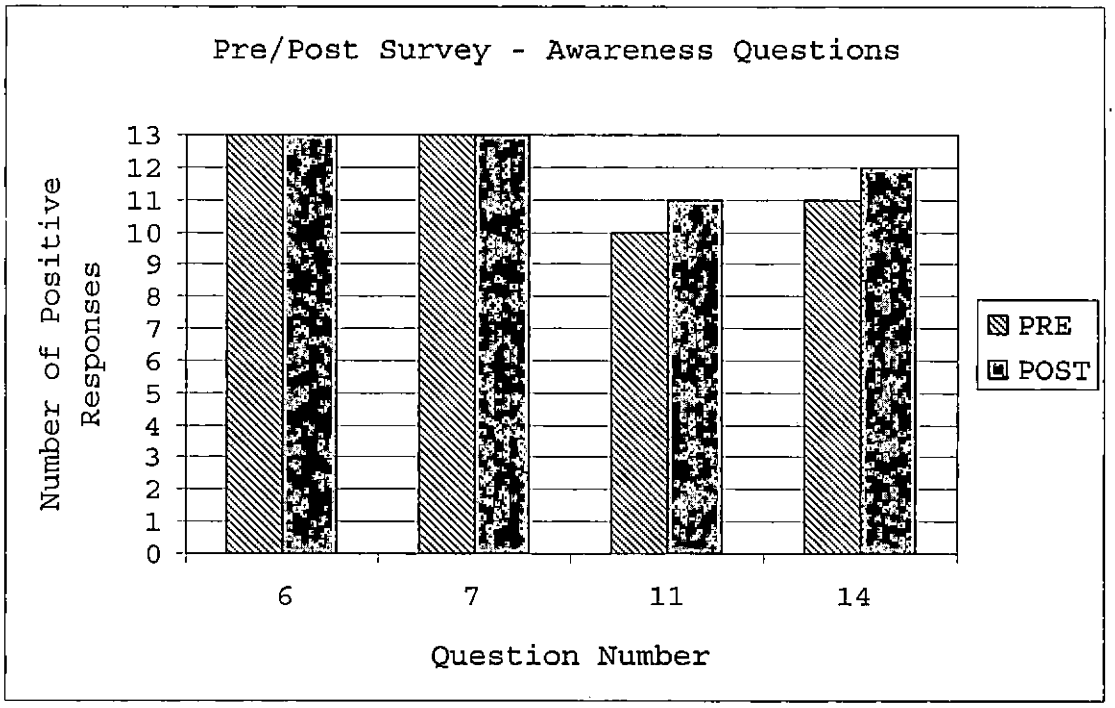


Figure 4. Analysis of responses to awareness questions comparing pre-hike and post-hike surveys of hikers who used the trail guide.

Overall only a small increase in awareness was noticed for hikers who used the trail guide. This was in the areas of whether personal actions at home and at the trail affect the area, and if the visitor is aware of resources available at Grassy Hollow Visitor Center.

Findings for the Appreciation Goal

The questions which try to elicit an indication of appreciation of the area are all Lickert scale questions. The three questions ask about the hiker's feelings regarding the natural environment, the hike, and learning from an interpretive guide. The scale of responses used is: great, good, OK, not that good, and very bad. Almost all of the responses were positive for both groups. The only clear differences were for the third question regarding learning from an interpretive trail guide. The group who had hiked with the trail guide responded much more positively than did the other group. The responses to each question are shown below in the three graphs of Figure 5, Figure 6, and Figure 7.

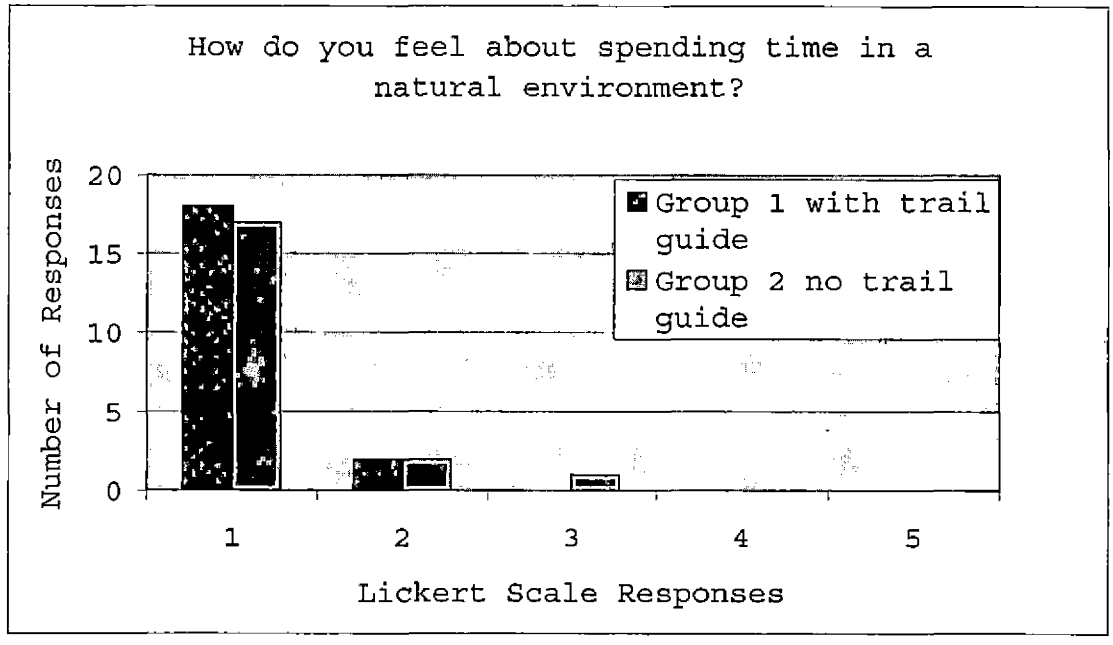


Figure 5. Analysis of responses to question number eight. Lickert scale responses are: 1-great, 2-good, 3-OK, 4-not that good, 5-very bad.

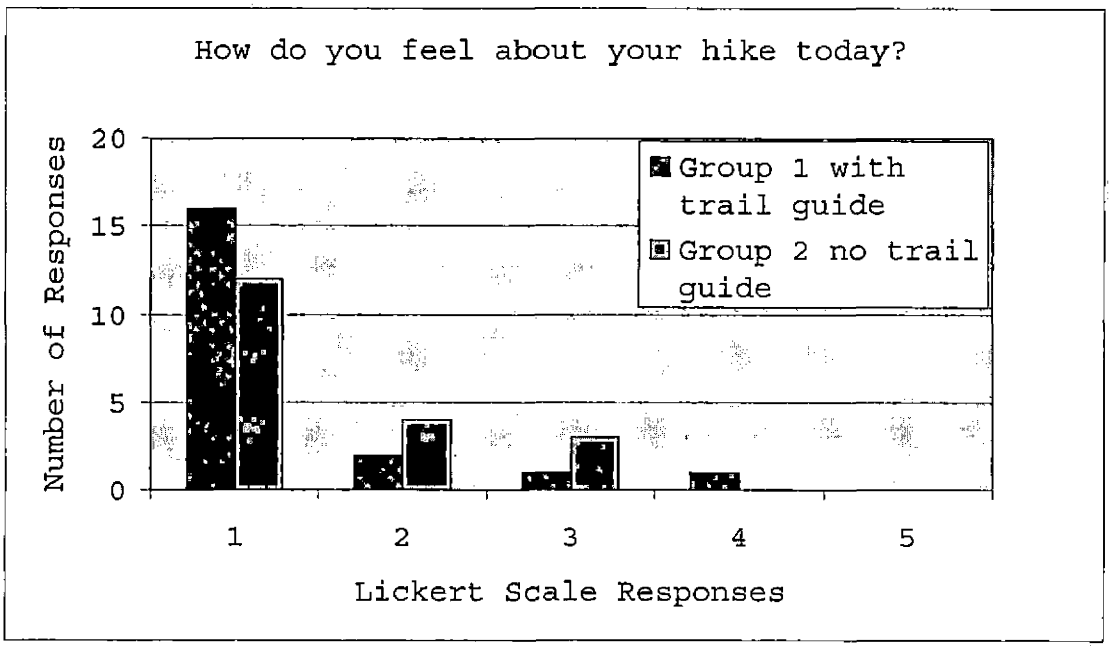


Figure 6. Analysis of responses to question number nine. Lickert scale responses are: 1-great, 2-good, 3-OK, 4-not that good, 5-very bad.

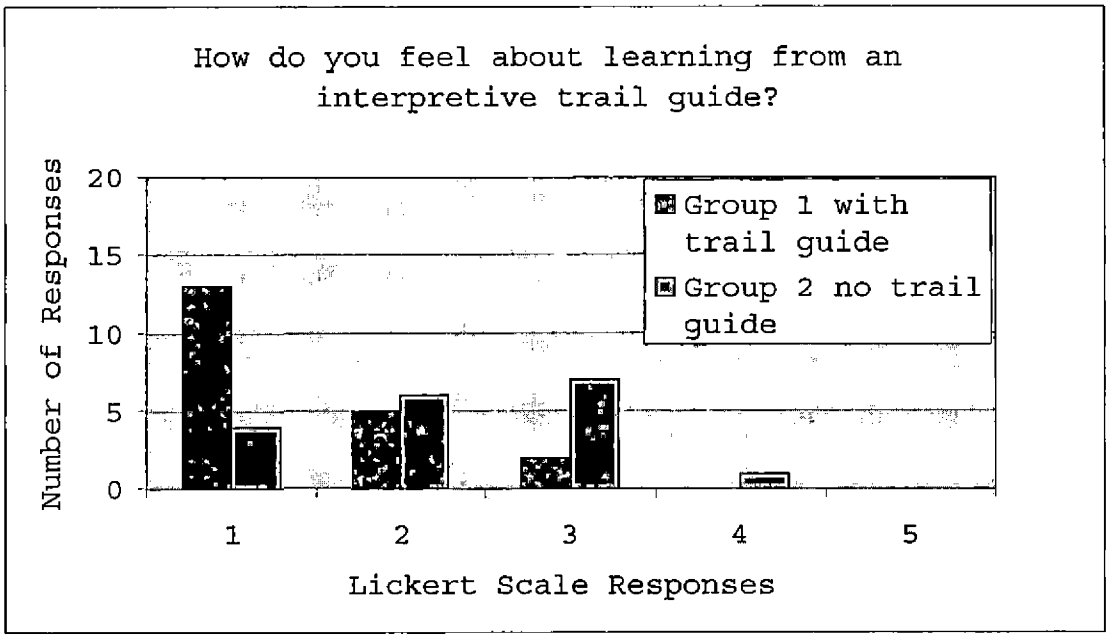


Figure 7. Analysis of responses to question number ten. Lickert scale responses are: 1-great, 2-good, 3-OK, 4-not that good, 5-very bad.

Only one appreciation question is on the pre-hike survey. The questions asking about the hiker's feelings toward the hike and learning from an interpretive trail guide were not included on the pre-hike survey since they relate to the actual hiking experience. All 13 of the hikers who completed a pre-hike survey responded with "great" to the question, "How do you feel about spending time in a natural environment?" Their responses were also all "great" on the post-hike survey.

Comparison of Hiker Experience With Increases in Knowledge, Awareness and Appreciation

Before administering the survey it was thought that the results may be influenced by the number of experiences a hiker has had in the area, so this information was asked for on the survey. Overall, the group that hiked with the trail guide had many previous experiences in the area. Two hikers indicated that this was their first time hiking in the area. Two others indicated that they had hiked here less than five times. Nine hikers noted hiking in the area between five and ten times. Seven hikers said that they had hiked in the area at least 20 or more times, and up to 50 times.

The group who hiked without the survey was less experienced with the area. Nine hikers indicated that this was their first time hiking in the area. Five others reported having hiked here five or less times. One hiker had hiked between five and ten times, and five indicated that they had hiked in the area at least 20 or more times, and also up to 50 times.

Experience in the area may or may not have increased a hiker's knowledge of specific history, animals, and plants given the results from the graphs above. However, less experience in the area probably did affect the

answers to awareness questions. Appreciation was also probably less affected by the experience level of the hikers.

Discussion of the Findings

The quantifiable results of the survey show that this interpretive trail guide can be effective at changing hikers' knowledge of the area. Changes in awareness and appreciation are less obvious. However, the quantifiable survey responses were not the only ones received. Several surveys from the group who hiked with the trail guide had additional comments written on them or attached. Many hikers also discussed their hiking experience when they returned their surveys. These qualitative responses were also taken into account in interpreting the findings.

Comments from Hikers About Using the Trail Guide

Most of the hikers who used the trail guide had positive comments about it. They felt it was easy to use, the pictures were clear and aided in identifying plants, and they felt it added to their hiking experience. Several hikers reported using the trail guide like a "treasure hunt" as they looked for the plants and trail stops along the way. Several also stated that the stops provided a great way to take a short break from hiking

without having to admit they wanted to rest or catch their breath. One group who hiked to the summit reported that they enjoyed the lower section of the trail with the trail guide much more than the upper part, and they wished the trail guide went all the way to the summit. Several of the hikers who reached the top were curious about plants growing near the summit which were not included on the trail guide.

Not all of the hikers liked hiking with the trail guide. Three surveys contained additional comments indicating that they read the guide only briefly during the hike or after the hike was finished. Two of these same hikers also felt that it was too difficult or disruptive to stop and read while hiking this particular trail.

Comments From Hikers Concerning Knowledge, Awareness and Appreciation Goals

Several interesting details regarding the goals of increasing knowledge, awareness, and appreciation came out of the hiker comments and discussions. Although the graphs above show an increase in knowledge, the data may not adequately indicate overall increases in knowledge. One hiker stated that although he knew the answers to all of the knowledge and awareness questions on the pre-hike

and post-hike surveys he had learned about four other plants that are listed on the trail guide which were new to him. Coincidently, this hiker said he had worked for several years as a naturalist at the Los Angeles County Outdoor School nearby in Wrightwood. Other hikers also mentioned learning "lots of new things".

Appreciation may not have been adequately assessed through the survey questions. In a discussion with one hiker concerning her appreciation of the area, she felt that knowing more of the native plants helped her to appreciate her hike and her surroundings more, but there was no way of indicating this through the survey questions. Several surveys contained comments about the beautiful day and how much the hikers enjoyed hiking. In discussions, several groups of hikers indicated that the group experience itself was a key element in their appreciation of the hike. One hiker also noted that "friendship" was one of the main reasons people would come to the area.

Conclusion

The data clearly shows that the trail guide did increase visitors' knowledge of the area. Awareness was also increased somewhat by the trail guide. While the

data does not indicate a clear increase in appreciation, it is possible that this is due more to shortcomings in the survey itself. The appreciation level as assessed by the survey was already high for almost all of the hikers. Therefore, there was less room to indicate change. Different questions may have shown an increase in appreciation. Also, appreciation may be a more difficult quality to assess through a survey.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Through the development of the Mt. Baden-Powell trail guide visitors now have a new opportunity to gain knowledge, awareness of, and appreciation for the area by participating in non-formal environmental education. After researching and developing the Mount Baden-Powell trail guide and testing it for effectiveness the following conclusions have been drawn.

The research phase of this project may have had an impact on the availability of other interpretive materials. Over the last several years trail guides have not been available for any of the other local nature trails. After seeking out the guides and bringing it to the attention of both the volunteers and Forest Service employees, there have now been trail guides in the trailside boxes for two of these trails.

The trail guide developed through this project offers visitors information about the trees, plants, animals, human and geologic history of the area, and about the trail itself. It was demonstrated through the survey of hikers that this trail guide can successfully increase

hikers' knowledge of the area. Through discussions with hikers it also seemed to increase visitor awareness and appreciation, although these changes were not quantifiable.

The trail guide was also successful in including ideas from the field of interpretation and environmental education as developed in the literature review. Research done by D. Knapp and T. Volk found that interpretation, as a form of non-formal environmental education, can promote ecological knowledge (Knapp & Volk, 1997). The results of the hiker survey for this project were in line with Knapp and Volk's findings.

Freeman Tilden proposed that interpretation must relate to the experience of the visitor (Tilden, 1957). The trail guide uses language to help to relate concepts more personally to the visitor. Examples include: "Look carefully and you may see some!" and "If it is a warm day, try leaning against the flat face of this boulder for a cool break." Hiker comments such as, "I learned so much. It really opened up my eyes to how much is there," and "We did lean on that boulder. It was so cool!" indicate that hikers were personally involved in their learning.

According to Grant Sharp (1982) interpretation should help to make the visit a rich and enjoyable experience.

Based on hiker comments and discussions the trail guide is a successful component for adding meaning and enjoyment to this hike.

Recommendations

The overall response to the trail guide was positive, but there are some recommendations for the future for the trail guide, the trail itself, and for further research.

Recommendations for the Trail Guide

Currently the trail guide is only available to those hikers who participated in the survey and a few other interested individuals. Ideally, in the near future the trail guide will be available at Grassy Hollow Visitor Center. In order to have the color photographs be clear the trail guide is printed on laser cardstock. This is much more costly per trail guide so a small price could be charged to cover the cost of printing. The trail guides could also be sold at a slightly higher price which could then be used as a donation to the visitor center. This would allow people to use this new resource and also increase donations for the visitor center.

Recommendations for the Forest Service

During the process of completing this project it was repeatedly noticed that there is a need for trail

maintenance on the Mount Baden-Powell trail and other local area trails. The trail sign which points out the trail leading to Lamel Spring has been missing for several years (reportedly eaten by termites). Only the sign post remains, lying near the trail. Trail signs are also down and missing on the Mine Gulch trail. Some of the switchbacks on the Mount Baden-Powell trail have been cut so often that, when hiking downhill, it is difficult to tell which path to take. The sign urging hikers to not cut the switchbacks has also been missing for some time. These signs need to be replaced and trail cuts blocked off in order to help preserve these trails. Although trail maintenance in this area may be done by the Boy Scouts or Volunteers of the Angeles Forest, the responsibility lies with the Forest Service.

Recommendations for Further Research

The completion of this project also indicates a need for further research in several areas. One area for additional study is to provide a more in depth analysis of the value of the trail guide in changing visitors' appreciation of the area. The questions used in the survey part of this project did not adequately determine if there was in fact any change or not in visitor appreciation after using the trail guide, however

discussions with hikers did indicate that some change had taken place. Additional surveys or other methods of research focused specifically on the appreciation aspect, could give more information about this.

Another area for future research would be to determine if use of this trail guide or other interpretive materials impacts visitor behavior. For example: Does implementing an interpretive trail guide or other program change the amount of trash found, the cutting of switchbacks, or amount of graffiti in the area? The research in this area has not been conclusive. Ballantyne's research (1994) showed that engaging visitors through storytelling about the natural and cultural environment leads to changes in knowledge, skills, attitudes, and behaviors (Ballantyne, 1994). However, Knapp & Barrie's results found that environmental interpretation has not been effective at changing skills, attitudes, and behaviors (Knapp & Barrie, 1998).

Summary

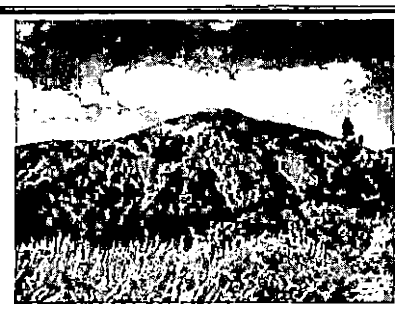
The various components of this project including the literature review, researching and developing the trail guide, and conducting the survey have all shown that interpretation can in fact play an important role in

environmental education. The development of the Mount Baden-Powell trail guide has allowed more opportunity for visitors to enjoy and learn about themselves and the world around them by becoming a small part of the Mount Baden-Powell story.

APPENDIX A

TRAIL GUIDE

Welcome to Mt. Baden-Powell
Hike to Lamel Spring



Mt. Baden-Powell (9,399') is the second highest peak in the San Gabriel Mountains. From the trailhead at Vincent Gap (6,450') the four mile trail climbs 2,800' to the summit. Lamel Spring is located about half way up the trail. This trail guide describes some of the plants and features you will see on the trail as far as Lamel Spring. Whether you hike all the way to the summit or a portion of the trail, the hike offers spectacular views, a good workout, and an opportunity to learn about, observe, and know this mountain environment.

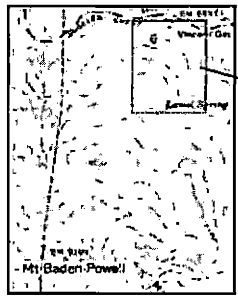
The native plants and animals of Mt. Baden-Powell are tied to the conditions which exist on the mountain where they live. By learning and understanding a little about the plants, animals, rocks, and history of this mountain, we also become a part of the mountain. Knowing something about a place ties us to that place.

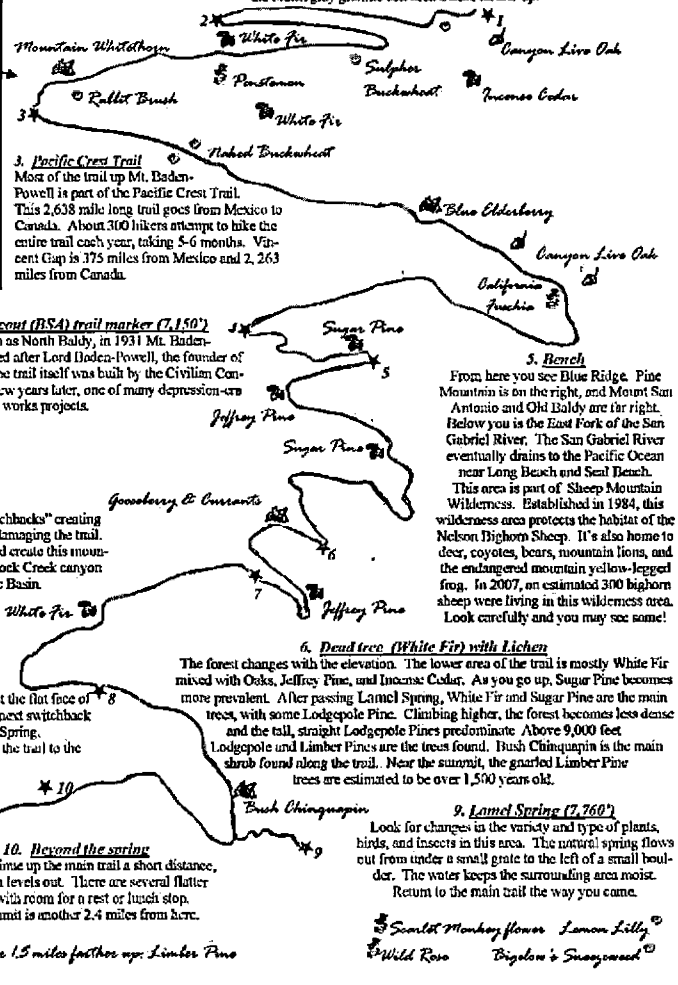
From the moment you set foot here, you too are part of this environment, part of the Baden-Powell natural and human history. Walk softly, use your senses, and take a break now and then as you hike to learn about life here.

About the hike

Vincent Gap to Lamel Spring: 1.6 miles each way. Approx. 1.5 hours up, 1 hour to return.
Vincent Gap to the summit: 4 miles each way. Approx 3.5 hours up, 2.5 hours to return.
(Of course, your time may vary)
Season: June-October. Mid-day can be hot.

See back for Plant descriptions





1. Vincent Gap TRAILHEAD (6,450')
This area is named for Miner Vincent (Charles Tom Vincent) a big game hunter and prospector, founder of the Big Horn Gold Mine, who lived in this area from the 1870's to 1926.

2. Split rail fence
The beginning of the trail lies in the fault zone of a subsidiary of the San Andreas Fault which helped create these mountains. The bright red sedimentary soil near the parking lot contrasts with the bluish gray granitic soil seen a little farther up.

3. Pacific Crest Trail
Most of the trail up Mt. Baden-Powell is part of the Pacific Crest Trail. This 2,638 mile long trail goes from Mexico to Canada. About 300 hikers attempt to hike the entire trail each year, taking 5-6 months. Vincent Gap is 375 miles from Mexico and 2, 263 miles from Canada.

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Previously known as North Baldy, in 1931 Mt. Baden-Powell was renamed after Lord Baden-Powell, the founder of the Boy Scouts. The trail itself was built by the Civilian Conservation Crew a few years later, one of many depression-era works projects.

5. Bench
From here you see Blue Ridge. Pine Mountain is on the right, and Mount San Antonio and Old Baldy are far right. Below you is the East Fork of the San Gabriel River. The San Gabriel River eventually drains to the Pacific Ocean near Long Beach and Seal Beach.
This area is part of Sheep Mountain Wilderness. Established in 1984, this wilderness area protects the habitat of the Nelson Bighorn Sheep. It's also home to deer, coyotes, bears, mountain lions, and the endangered mountain yellow-legged frog. In 2007, an estimated 300 bighorn sheep were living in this wilderness area. Look carefully and you may see some!

6. Dead tree (White Fir) with Lichen
The forest changes with the elevation. The lower area of the trail is mostly White Fir mixed with Oaks, Jeffrey Pine, and Incense Cedar. As you go up, Sugar Pine becomes more prevalent. After passing Lamel Spring, White Fir and Sugar Pine are the main trees, with some Lodgepole Pine. Climbing higher, the forest becomes less dense and the tall, straight Lodgepole Pines predominate. Above 9,000 feet Lodgepole and Limber Pines are the trees found. Bush Chinquapin is the main shrub found along the trail. Near the summit, the gnarled Limber Pine trees are estimated to be over 1,500 years old.

7. Erosion
In this area, hikers have "cut the switchbacks" creating new shortcuts. This causes erosion, damaging the trail. Erosion by water and wind have helped create this mountain. Ahead there are views of Big Rock Creek canyon which drains to the Mojave Basin.

8. Boulder
If it is a warm day, try leaning against the flat face of this boulder for a cool break. At the next switchback the side trail leads to Lamel Spring.
(Currently the sign post lays across the trail to the spring.)

9. Lamel Spring (7,760')
Look for changes in the variety and type of plants, birds, and insects in this area. The natural spring flows out from under a small grate to the left of a small boulder. The water keeps the surrounding area moist.
Return to the main trail the way you came.

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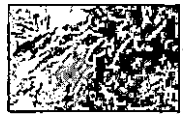
If you continue up the main trail a short distance, the terrain levels out. There are several flatter areas with room for a rest or lunch stop.
The summit is another 2.4 miles from here.



Penstemon (penstemon rostriflorus) Bright red tubular flowers; blooms July – August; upright flower stems 12 – 18" high; common on dry slopes; look and listen for hummingbirds near this plant; stems turn bright red in fall.

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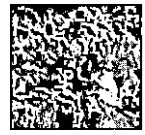

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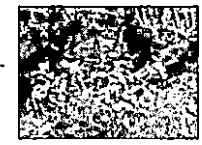
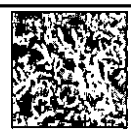
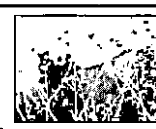




Scarlet Monkey flower (Mimulus cardinalis) Found in moist areas; red-orange flowers summer to fall; 10 – 36" high; another hummingbird favorite.

Wild Rose (Rosa woodsii) Usually found in moist, shady areas; 1"-2" pink, five-petaled flowers in late spring and summer; 2' – 6' high shrub; fragrant flowers are followed by red "rose hips" fruit in fall.

Bigelow's Sneezeweed (Helenium bigelowii) Found in moist areas; yellow flowers bloom from late spring – fall; 2' – 4' tall; in the sunflower family.



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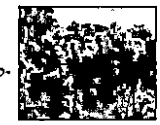
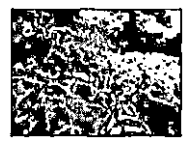


Mountain Whitethorn (also called **Deer Brush**) (Ceanothus cordulatus) Gray-green leaves; sharp, 1" long thorns; 2' – 4' shrub; deer like to nibble the ends of the branches.

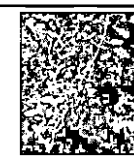
Blue Elderberry (Sambucus Mexicana) Flat-topped flower clusters creamy white; small blue berries in clusters; blooms early summer; usually a bushy shrub here, with bright green leaves; edible berries.



Currant and Gooseberry (Ribes) Leaves of both plants are very similar, flowers white to pink bells, droop down in clusters; berries may be red or blue with whitish bloom depending on species; gooseberry stems and fruits are covered with prickly spines.

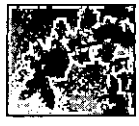
Bush Chinquapin (Chrysolepis sempervirens) A low growing shrub to 3' high; in the oak family; the dominant shrub found at upper elevations here.

Canyon Live Oak (Quercus chrysolepis) Evergreen leaves 1—3" long; may have spiny teeth along edges; golden fuzz under leaves; acorns 1" or longer with yellowish hairs on cup.



Incense Cedar (Calocedrus decurrens) Shiny green scales; aromatic fragrance; thick, often shredding bark; Native Americans used strips of bark as walls for shelters.

Jeffrey Pine (Pinus jeffreyi) Needles in clusters of 3, 5"-8"long; also known as Western Yellow Pine; bark has a strong, sweet smell like vanilla or butterscotch.



Sugar Pine (Pinus lambertiana) Long 12"-18" cones hang down from the tips of the branches; needles 2"-3" in bundles of five; largest pine, up to 200' high; Native Americans ate the pine nuts (seeds) and chewed the sap, which is sweeter than that of other pines.

White Fir (Abies concolor) Needles grow straight up from the twig in two rows, not in bundles; curving upward; cones are small, with tightly overlapping scales which sit upright on branches; may be up to 200' high.

Lodgepole Pine (Pinus contorta) Needles 2 in a bunch, 1-3" long; small, roundish cones to 2"; usually found above 8,000'; may be 20– 80' high.

Limber Pine (Pinus flexilis) May be straight, but often gnarled and contorted by wind and heavy snows; needles in bundles of 5; cones 3 –6"; branches very flexible; "Wally Waldron" tree estimated to be 2,000 years old.

Please visit Grassy Hollow Visitor Center to see examples of many of the animals and birds which are native in this area.

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Hike to Lamel Spring

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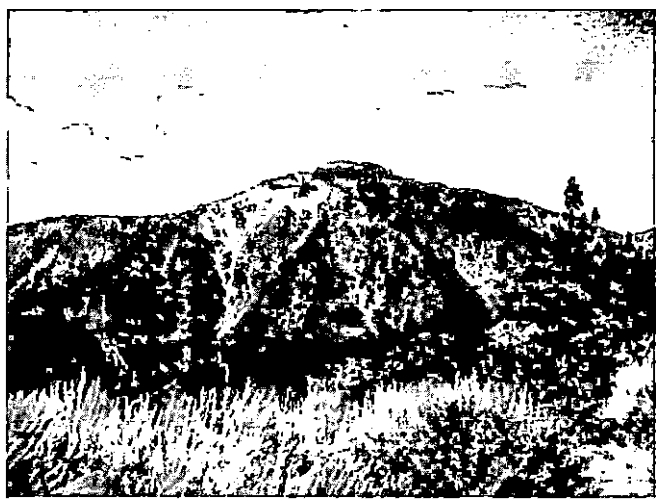

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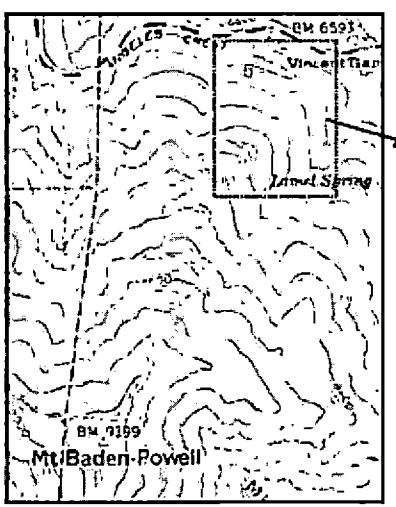

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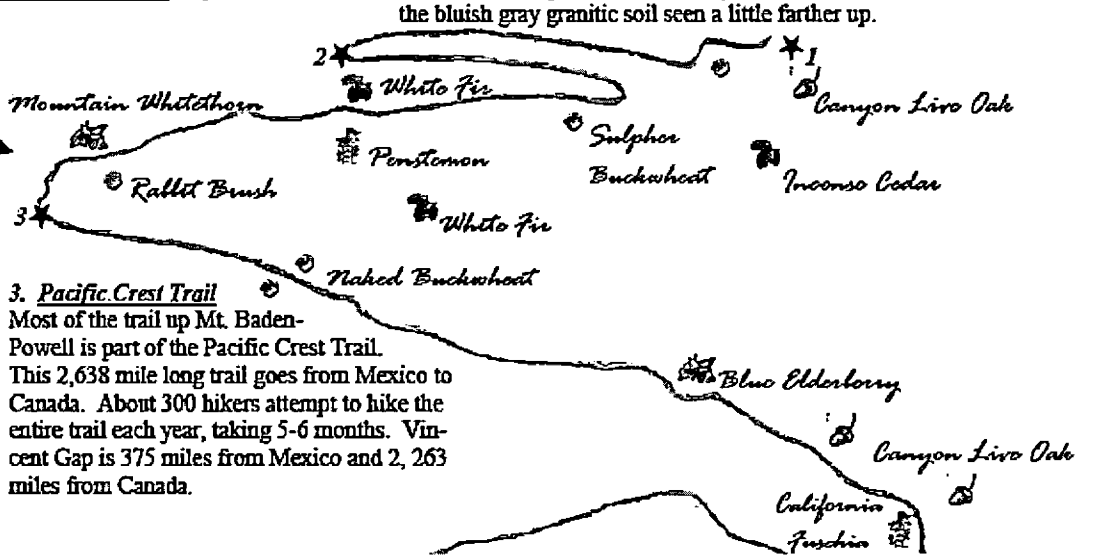

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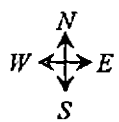

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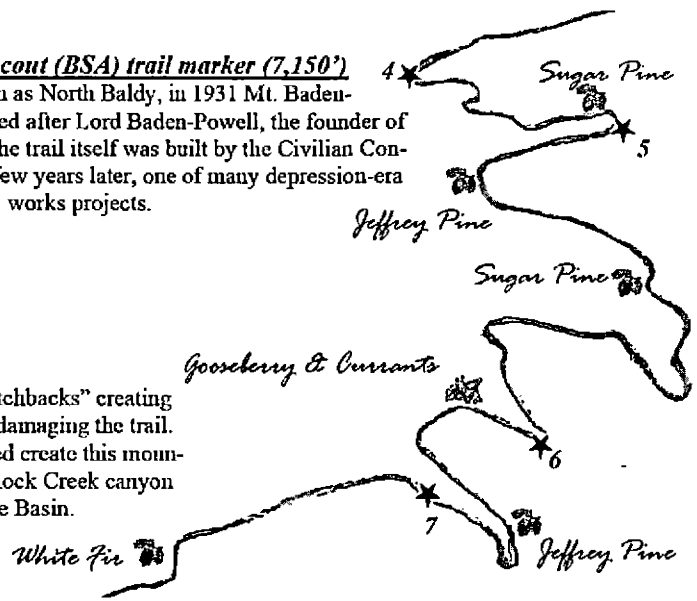

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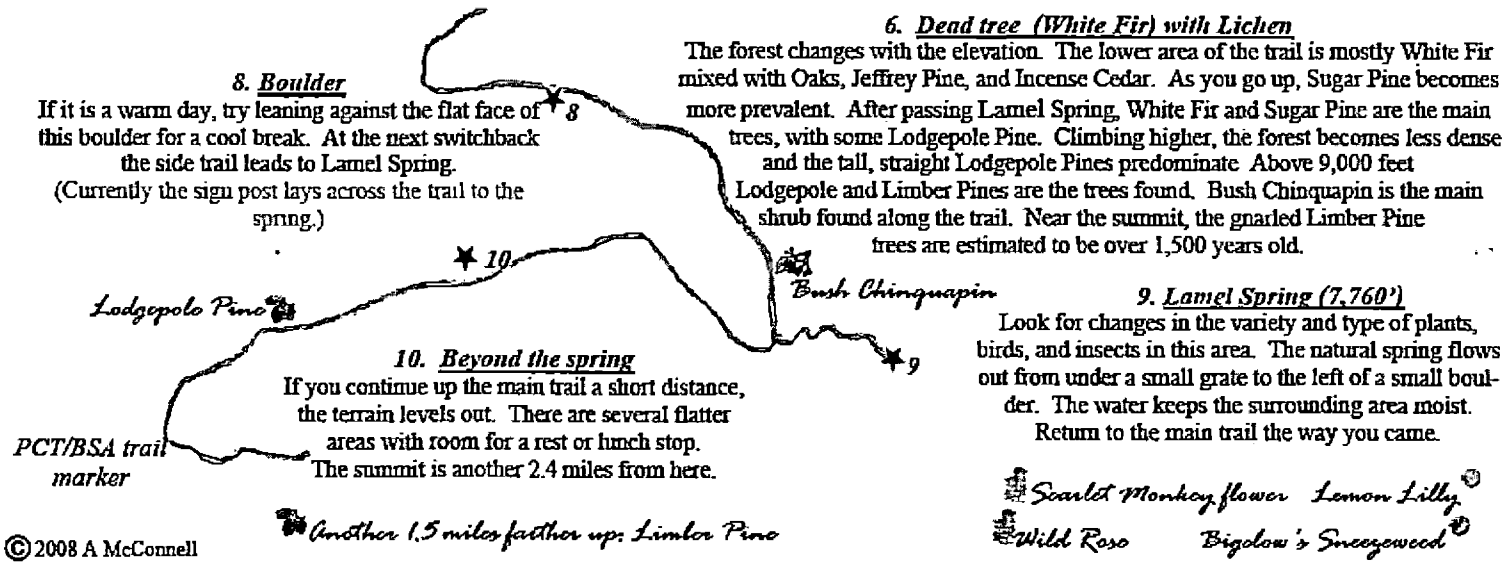

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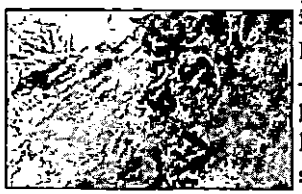

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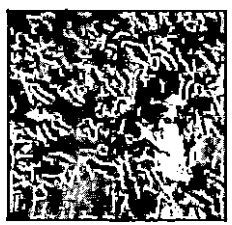

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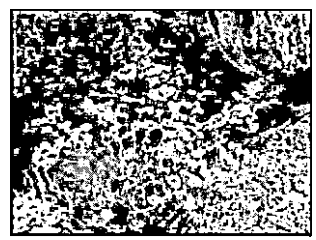

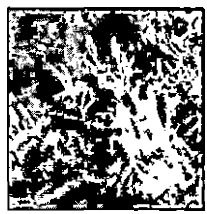

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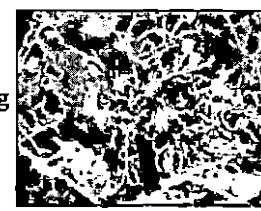

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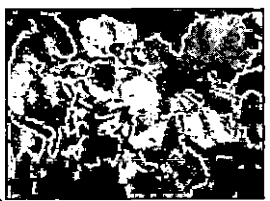
Naked Buckwheat (Eriogonum nudum) Small compact cream to pink flowers at the end of leafless stems; 12"-36" high; blooms mid to late summer.

Rubber Rabbit Brush (Chrysothamnus) Yellow flowers late summer—fall; 2 –3' high; flexible green branches; a type of rubber can be made from this plant.

Mountain Whitethorn (also called **Deer Brush**) (Ceanothus cordulatus) Gray-green leaves; sharp, 1" long thorns; 2' – 4' shrub; deer like to nibble the ends of the branches.

Blue Elderberry
(Sambucus Mexcana)
Flat-topped flower clusters creamy white; small blue berries in clusters; blooms early summer; usually a bushy shrub here, with bright green leaves; edible berries.



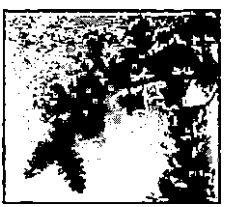
Currant and Gooseberry (Ribes)
Leaves of both plants are very similar; flowers white to pink bells, droop down in clusters; berries may be red or blue with whitish bloom depending on species; gooseberry stems and fruits are covered with prickly spines.

Bush Chinquapin (Chrysolepis sempervirens) A low growing shrub to 3' high; in the oak family; the dominant shrub found at upper elevations here.

Canyon Live Oak
(Quercus chrysolepis)
Evergreen leaves 1—3" long; may have spiny teeth along edges; golden fuzz under leaves; acorns 1" or longer with yellowish hairs on cup.

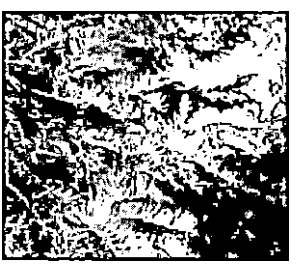
Incense Cedar (Calocedrus decurrens)
Shiny green scales; aromatic fragrance; thick, often shredding bark; Native Americans used strips of bark as walls for shelters.

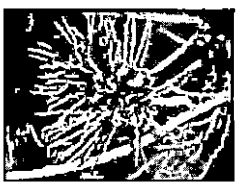
Jeffrey Pine (Pinus jeffreyi)
Needles in clusters of 3, 5"-8"long; also known as Western Yellow Pine; bark has a strong, sweet smell like vanilla or butterscotch.



Sugar Pine (Pinus lambertiana)
Long 12"-18" cones hang down from the tips of the branches; needles 2"-3" in bundles of five; largest pine, up to 200' high; Native Americans ate the pine nuts (seeds) and chewed the sap, which is sweeter than that of other pines.

White Fir (Abies concolor)
Needles grow straight up from the twig in two rows, not in bundles; curving upward; cones are small, with tightly overlapping scales which sit upright on branches; may be up to 200' high.





Lodgepole Pine (Pinus contorta)
Needles 2 in a bunch, 1-3" long; small, roundish cones to 2"; usually found above 8,000'; may be 20– 80' high..

Limber Pine (Pinus flexilis)
May be straight, but often gnarled and contorted by wind and heavy snows; needles in bundles of 5; cones 3 –6"; branches very flexible; "Wally Waldron" tree estimated to be 2,000 years old.

Please visit Grassy Hollow Visitor Center to see examples of many of the animals and birds which are native in this area.

APPENDIX B

SURVEYS

Pre-hike survey

Mt. Baden-Powell
Hike to Lamel Spring

1. Historically people have come to this area for _____?

   a. hunting b. mining c. recreation d. all of these

2. Which of these plants is most likely to be found in an area with more moisture?

a. Scarlet Monkeyflower b. Live Oak c. Sulphur Buckwheat d. Rabbit Brush

3. Which of these trees can be found at the top of Mt. Baden-Powell?

   a. Jeffrey Pine b. Sugar Pine c. Limber Pine d. Incense Cedar

4. Which of these factors have helped shape this mountain and life on it?

   a.. erosion b. earthquake faults c. weather d. elevation e. all of these

5. Bighorn Sheep live in this area. True False

6. When I use a trail it is best to stay on the established trail. True False

7. My own actions can help protect the Mt. Baden-Powell area. True False

8. How do you feel about spending time in a natural environment? _____

   a. great b. good c. OK d. not that good e. very bad

9. How do you feel about learning from an interpretive trail guide? _____

   a. great b. good c. OK d. not that good e. very bad

10. Do you feel actions people take at home, like recycling or cutting back on car trips, are connected to the mountain environment? Yes No

11. About how many times have you visited the Vincent Gap/Mt. Baden-Powell area?

_____

12. Do you know if the Grassy Hollow Visitor Center has information on animals and birds native to this area? Yes they do I don't know No they don't

13. Your age _____ Male / Female

Mt. Baden-Powell

Hike to Lamel Spring

See how much you learned on the trail today!

1. Historically people have come to this area for _____?

   a. hunting b. mining c. recreation d. all of these

2. Which of these plants is most likely to be found in an area with more moisture?

   a. Scarlet Monkeyflower b. Live Oak c. Sulphur Buckwheat d. Rabbit Brush

3. Which of these trees can be found at the top of Mt. Baden-Powell?

   a. Jeffrey Pine b. Sugar Pine c. Limber Pine d. Incense Cedar

4. Which of these factors have helped shape this mountain and life on it?

   a. erosion b. earthquake faults c. weather d. elevation e. all of these

5. Bighorn Sheep live in this area. True False

6. When I use a trail it is best to stay on the established trail. True False

7. My own actions can help protect the Mt. Baden-Powell area. True False

8. How do you feel about spending time in a natural environment? _____

   a. great b. good c. OK d. not that good e. very bad

9. How do you feel about your hike today? _____

   a. great b. good c. OK d. not that good e. very bad

10. How do you feel about learning from an interpretive trail guide? _____

    a. great b. good c. OK d. not that good e. very bad

11. Do you feel actions people take at home, like recycling or cutting back on car trips, are connected to this environment? Yes No

12. Including today, about how many times have you visited the Vincent Gap/Mt. Baden-Powell area? _____

13. Did you read the interpretive trail guide while hiking the Mt. Baden-Powell trail today? Yes No

14. Do you know if the Grassy Hollow Visitor Center has more information on animals and birds native to this area?

Yes, they do I don't know No, they don't

15. Your age _____ Male / Female

REFERENCES

Ballantyne, R. (1994). A checklist for the critical evaluation of informal environmental learning experiences. *Environmental Education and Information 13*(2), 111-124.

Beck, L., & Cable, T. (2002). *Interpretation for the 21st century: Fifteen guiding principles for interpreting nature and culture*. Champaign, Il: Sagamore.

Brody, M. (2005). Learning in nature. *Environmental Education Research, 11*(5), 603-621.

Chadhodar, Y., & McLoughlin, L. (1999). Interpretation at wetland sites in the Sydney region. *Journal of Interpretation Research* 4(1), 39-57.

Chester, T.(2002-2003). *Field Guide to the San Gabriel Mountains*. Retrieved July 24, 2008 from http://tchester.org/sgm/index.html

Chester, T.(2002-2003). *Hikes in the San Gabriel Mountains*. Retrieved July 24, 2008 from http://tchester.org/sgm/index.html

Chester, T., & Strong, J. (2002-2003). Plant guide to Mt. Baden-Powell and Lamel Spring trail. Retrieved February 4, 2008 from

http://tchester.org/sgm/plants/guides/baden_powell_trail.html

Cullen, G. (2005). The status of environmental education with respect to the goal of responsible citizenship behavior. In H.R. Hungerford, W.J. Bluhm, T.L. Volk, & J.M. Ramsey, (Eds.), *Essential Readings in Environmental Education* (pp. 37-45). Champaign, IL: Stipes.

Garrett, L. (2008). How to install signs at the Cobb Estate. *The Wrentit, 56(2)*, 2-3.

Ham, S. (1992). *Environmental interpretation*. Golden, CO: Fulcrum.

Ham, S., & Krumpe, E. (1996). Identifying audiences and messages for nonformal environmental education—A theoretical framework for interpreters. *Journal of Interpretation Research, 1*(1), 11-23.

Havert, B., & Gray, G. (1996). *Nature guide to the mountains of southern California by car and on foot.* Idyllwild, CA: Earth Trails Publications.

Hungerford, H. & Volk, T. (1990). Changing learner behavior through environmental education. *Journal of Environmental Education, 21*(3), 8-22.

Knapp, D. (1994). *Validating a framework of goals for program development in environmental interpretation.*

Unpublished doctoral dissertation, Southern Illinois University, Carbondale.

Knapp, D. (2005). Environmental education and environmental interpretation: The relationships. In H.R. Hungerford, W.J. Bluhm, T.L. Volk, & J.M. Ramsey, (Eds.), *Essential Readings in Environmental Education* (pp. 349-354). Champaign, IL: Stipes.

Knapp, D., & Barrie, E. (1998). Ecology versus issue interpretation: The analysis of two different messages. *Journal of Interpretation Research, 3*(1), 21-38.

Knapp, D., & Volk, T. (1997). The identification of empirically derived goals for program development in environmental interpretation. *Journal of Environmental Education, 28*(3), 24-34.

National Forest Service. (1990). Objectives and policies of the interpretive services program (Publication No. FSM 2390.2). Washington, DC: Author.

National Park Service. (1992). *National Parks for the 21st century: The Vail agenda*. Washington, DC: National Park Service.

Regnier, K., Gross, M., & Zimmerman, R. (1992). *The interpreter's guidebook: Techniques for programs and*

presentation. Stevens Point, WI: University of Wisconsin-Stevens Point.

Rideout, S., & Legg, M. (2000). Factors limiting minority participation in interpretive programming: A case study. *Journal of Interpretation Research, 5*(1), 53-58.

Robinson, John W. (1991). *The San Gabriels*. Arcadia, CA: Big Santa Anita Historical Society.

Robinson, John W. (1984). *Trails of the Angeles 100 hikes in the San Gabriels*. Berkeley, CA: Wilderness Press.

San Bernardino Mountains Land Trust (1999). *Wildflowers of the San Bernardino Mountains*. Lake Arrowhead, CA: Irvine Press.

Sharpe, G. (1982). *Interpreting the environment*. New York: Wiley.

Stapp, W.B., et al. (1969). The concept of environmental education. *The Journal of Environmental Education 1*(1), 30-31.

Storksdieck, M., Ellenbogen, K., & Heimlich, J. (2005). Changing minds? Reassessing outcomes in free-choice environmental education. *Environmental Education Research, 11*(3), 353-369.

Tbilisi Intergovernmental Conference on Environmental Education. (1977). *The Tbilisi Declaration.* In H.R. Hungerford, W.J. Bluhm, T.L. Volk, & J.M. Ramsey, (Eds.), *Essential Readings in Environmental Education* (pp. 13-16). Champaign, IL: Stipes.

Tilden, F. (1957). *Interpreting our heritage.* Chapel Hill: University of North Carolina Press.

Trapp, S., Gross, M., & Zimmerman, R. (1991). *Signs, trails, and wayside exhibits: Connecting people and places.* Stevens Point, WI: UW-SP Foundation Press.

US Census Bureau (1997). Retrieved October 26, 2008 from http://factfinder.census.gov/home/saff/main.html?_lang=en

USDA Forest Service-Angeles National Forest. (2006, June 08). Angeles National Forest recreational activities Vincent Gap to Mount Baden-Powell. Retrieved February 4, 2008 from http://www.fs.fed.us/r5/angeles/recreation/hike-vincent2badenpowell.shtml

Young, C., & Witter, J. (1994). Developing effective brochures for increasing knowledge of environmental problems: The case of the gypsy moth. *Journal of Environmental Education, 25*(3), 27-34.