

# EVALUATING THE EFFECTIVENESS OF WILDERNESS CAMPSITE MONITORING AT LINVILLE GORGE WILDERNESS

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## Abstract

Effective monitoring programs are essential for wilderness managers to provide opportunities for high quality recreational experiences while preserving natural conditions in federally designated wilderness, as mandated by the Wilderness Act of 1964 (PL 88-577). Ecological impacts as a result of recreational use in the form of litter, development, tree damage, vegetation loss, and campsite area proliferation are ongoing challenges for managers. Onsite investigations were conducted to determine whether the monitoring instruments and baseline data used by managers of the Linville Gorge Wilderness, located in the Pisgah National Forest of North Carolina, were effective and reliable benchmarks for establishing a credible monitoring program. In order to evaluate the reliability and validity of both instruments used and monitoring program implemented, ground-truthing was implemented as a method to compare and to validate existing/legacy data to current onsite conditions and number of total campsites identified. Results indicate that the current campsite monitoring program is not adequate and a number of campsites have exceeded standards identified in the Land and Resource Management Plan.

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## 1.0 Introduction and Literature Review

Since the passing of the Wilderness Act of 1964 (PL 88-577), wilderness managers have been challenged by the “compromising of mandates” in their effort to provide opportunities for high quality recreation experience opportunities while preserving natural conditions in federally designated wilderness. It was apparent early on, that the Wilderness Act of 1964 was not enough to preserve and protect the ecological and human values

for which these areas have been designated (Krumpe 2000). For example, the National Management Forest Act of 1974 further safeguarded incompatible usage on wilderness lands, imposed inventory and environmental assessment requirements, and increased the integration of public input in the wilderness planning process.

While myriad management actions have been implemented to address varying degrees of ecological impacts as a result of recreational use, there is often little information as to the degree of these impacts, how campsite and trail conditions have changed over time, and whether the management actions implemented to address them have been effective (Flood 2001). Impacts in the form of litter, improper disposal of human waste, degradation of water quality, erosion from extensive human use, tree damage, and vegetation impacts are ongoing challenges for managers. Because each area differs in its biological composition, unique problems, and types of visitor use, management approaches need to be specifically selected for each area (Cole 2000). Various planning frameworks have been designed in order to better manage protected areas by addressing concerns of carrying capacity and biophysical impacts while meeting the recreational demands of a diversified public. Two of the most widely used include the Recreational Opportunity Spectrum (ROS) and Limits of Acceptable Change (LAC). Researchers (Stankey et al. 1985; Cole and others 2001) have long held that effective monitoring is an essential component of any successful wilderness management program.

Landres et al. (2001: 4) define monitoring as “the process of repeatedly measuring an attribute over time to determine changes in location or condition.” Since monitoring is not required by law, not all wildernesses acquire this information to establish baseline data; even though any wilderness that receives overnight use probably needs monitoring (Cole 1989). Landres et al. (1994) identify that three primary purposes for wilderness monitoring are to improve: 1) wilderness management; 2) the acquisition and application of knowledge from wilderness; and 3) the assessment and status of trends

in the NWPS. While conducting a national evaluation of baseline data for all wildernesses in the National Wilderness Preservation System for the 20th century, Cole and Wright (2003) found that the distribution of data (trail, campsite, and social) is inequitable across the nation as well as the four agencies that manage wilderness. Only five wildernesses were identified as having complete baseline data. Linville Gorge Wilderness was identified as one of these.

## 2.0 Methods

This pilot study was conducted to assess baseline data on campsites and to determine the feasibility of using Linville Gorge Wilderness (LGW) as an area for research. LGW is located in the Mountain Region of western North Carolina. The roughly 13,000 acres of wilderness is part of the Pisgah National Forest and is managed by the Grandfather Ranger District. The rugged terrain ranging in elevation from 1,300 to 4,120 feet, with poor accessibility, was deemed too difficult and costly to log. Hence, the area is comprised of over 95 percent old growth/pre settlement dense hardwood, pine and hemlock forests. Over 30,000 visitors a year travel to LGW to view the scenery, day hike, backpack, rock climb, fish, and hunt. Twenty-two system trails, comprising 39 miles, attract hikers and backpackers throughout the year.

The study sample consisted of 15 campsites within the wilderness boundary. A campsite was identified as any site where human impacts were evident, provides a large enough area to place a tent, and impacts may or may not be centered around a fire ring. The indicators (vegetative loss, soil disturbance, fire scars, damage to overstory trees, and any development such as primitive or constructed seats) were used to measure the degree of impact caused by recreational use.

The first step conducted to investigate the monitoring program was the inspection and evaluation of existing legacy data for LGW located at the Grandfather Ranger District office. This included available campsite data, the implemented inventory system, and current and past management actions. Researchers developed an evaluation plan designed to determine the effectiveness of the inventory instrument, the reliability of past data

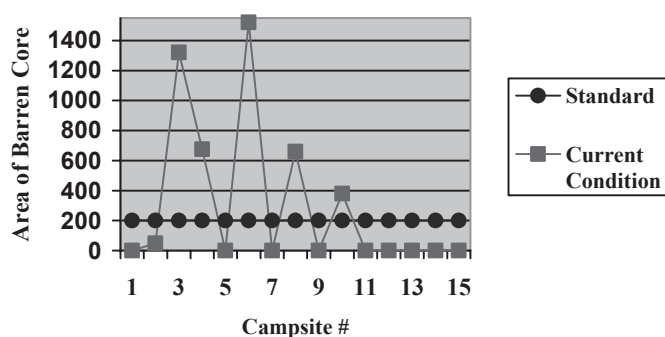
collection procedures, and the application of data to the management program. In order to evaluate campsites and compare existing campsite conditions to management standards, an inventory form adapted from the Bob Marshall Wilderness Complex Campsite Inventory (2002) was used. The indicators used to evaluate campsites were vegetation cover, vegetative loss, mineral soil increase, tree damage, root exposure, development, cleanliness, number of social trails, camp area and barren core camp area.

## 3.0 Results and Discussion

The current inventory instrument used at Linville Gorge Wilderness was determined to be inadequate and the inventory parameters used in the monitoring program were neither measurable nor objective. For example, the classifications for amount of litter were identified as light, medium, and heavy with no further definitive explanation for these parameters. To ensure accurate monitoring occurs over time, parameters must be defined and quantified. A lack of validity was identified based on a lack of comparison of current campsite conditions to a surrounding area with no impact, typically referred to as a control site. This site should be nearly identical in all physical attributes (soil type, vegetation type, topography and aspect) and used to make accurate measurements and comparisons of resource conditions over time. There was also a lack of relationship between the indicators of quality evaluated at a campsite and the objectives that the area was managed for. For example, one indicator to manage campsite densities at Linville Gorge Wilderness is by the number of campsites per mile, relative to its characterization as a primary, secondary, or tertiary trail. Although, the indicator used to evaluate campsite densities on the U.S. Forest Service inventory instrument is the number of campsites within view of one another. Locations and distance between campsites is an important indicator when evaluating opportunities for solitude while visitors are at their campsites. This important information was missing from the legacy data which is just one example indicative of the overall inadequacies of the pre-collected legacy data as well as the lack of reliability and limitations of the monitoring instrument. Moreover, no definitions for the indicators of quality were available, and methods for calculating indicators, such as mineral soil exposure were nonexistent. In order to have

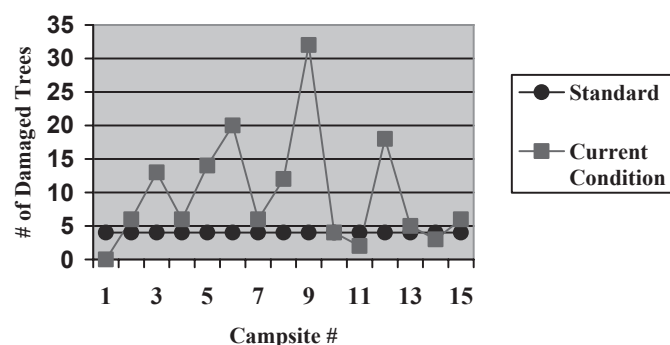
reliable monitoring protocols over a period of years, it is important that the parameters are identified and measured as accurately and consistently as possible. LGW also lacks a classification system to determine the overall impact of each campsite which is critical for directing management attention to the area(s) with the highest overall impact.

In an attempt to develop accurate and reliable monitoring protocols, measurements were collected for each indicator of quality and compared to management standards to determine if current conditions were within acceptable limits for the area. Five of the 15 campsites exceeded the barren core standards of 200 square feet (Figure 1).



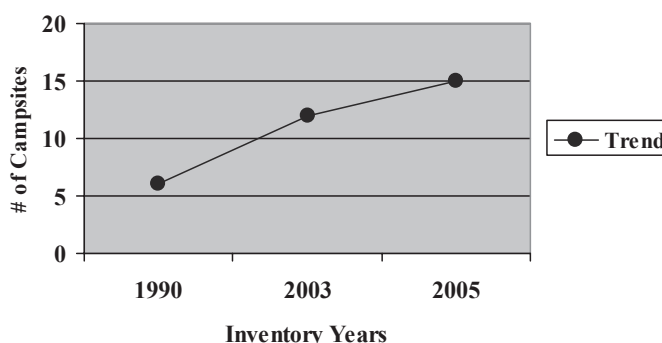
**Figure 1.—Barren core area**

Eleven of the 15 campsites exceeded standards of no more than four damaged trees (Figure 2). Seven campsites were identified on the 1.5-mile Pine Gap Trail, exceeding the standard of one campsite per mile. The Land and Resource Management Plan require a field survey be conducted every 2 years. The most recent survey was conducted in 2003, and prior to this, in 1990, although data for this year was unavailable. Moreover, limited visitor information is being provided at access points as required by the area management plan.



**Figure 2.—Tree damage**

Results indicate that the number of campsites inventoried within a given area has a direct relationship to the degree of impact. Furthermore, the number of campsites has increased within the area inventoried from six campsites in 1990, to 12 campsites in 2003, and 15 campsites in 2005 (Figure 3). LGW does currently have a permit system in place that limits use by individuals to 3 days and 2 nights and one weekend visit per month; group size is limited to 10.



**Figure 3.—Trend in campsite impacts**

## 4.0 Conclusion

An effective monitoring program is essential in any management program as it identifies accurate indicators, provides information on existing resource conditions, alerts managers when acceptable standards have been reached or exceeded, provides feedback on the effectiveness of implemented management actions while improving the overall effectiveness of the wilderness management program. Results indicate that LGW lacks an effective campsite monitoring program. Although a number of problems have been identified and potential solutions presented to address them, there may be more to this story than meets the casual observer/researcher.

Upon broader investigation, some of the problems facing managers of the LGW may be the result of multiple barriers which may include: lack of funding, lack of trained personnel, lack of effective planning to implement a quality LAC planning process, and not embracing the importance of monitoring. Recommendations to managers include: improving monitoring procedures, restructuring the permit system, and implementing a campsite restoration program to address campsites exceeding the acceptable standards for Linville Gorge Wilderness.

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