

Wilderness Campsite Conditions Under an Unregulated Camping Policy: An Eastern Example

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Abstract—This study identified and assessed 110 campsites in seven designated wilderness areas in the Jefferson National Forest of Virginia. The campsites were unevenly distributed within each wilderness, concentrating along trail corridors and near popular destination areas. With a few exceptions, most campsites surveyed were in good condition. The findings indicate that management actions should be directed at reducing both the number of campsites and the problems associated with campsite expansion. The Forest's unregulated camping policy could be focused through educational programs to encourage dispersed camping or camping containment to further reduce social and resource impacts.

Managing campsite impacts has always been a challenging task for wilderness managers, who are required by the 1964 Wilderness Act to preserve and enhance the wilderness resource while providing opportunities for solitude and unconfined recreation (Conrad 1997; Washburne and Cole 1983). The success of this task depends in part on the availability and judicious use of objective, timely information on the numbers, distribution and resource conditions of campsites. Impact assessment and monitoring (IA&M) programs for campsites, which can yield such information, are growing in recognition and use. However, these programs are less common in Eastern wilderness areas (McEwen and others 1996; Williams and Marion 1995).

Earlier settlement has left little wilderness in the Eastern United States. Only about four percent of the entire designated wilderness acreage is located in Eastern states (Landres and Meyer 1998). In general, Eastern wildernesses are much smaller (25% of the Western average), and they are closer to population centers (Landres and Meyer 1998). Despite their unique environmental and use attributes, Eastern wildernesses have received less research attention compared with their Western counterparts (Kulhavy and Legg 1998). This lack of information has limited our knowledge of region-specific impact patterns and trends, as well as the ability of wilderness managers to respond with effective campsite-management strategies and actions.

Camping and its associated resource and social impacts have been managed under a number of different policies and strategies (Leung and Marion 1999). Areas containing rare or sensitive natural and cultural resources may be closed to camping. A dispersed camping strategy seeks to reduce the frequency of camping use to avoid or minimize permanent resource impacts or visitor crowding. In more heavily visited areas, such impacts are often limited effectively by restricting camping to established or designated campsites. However, camping is unregulated in most wilderness areas, allowing visitors the freedom to select existing campsites or to create new campsites.

This paper presents results from the development and implementation of a campsite IA&M program for 11 wilderness areas of the Jefferson National Forest, Virginia. A comprehensive survey of wilderness campsites was performed to provide a baseline data set for comparison with future conditions (Leung and Marion 1995). This paper presents selected findings and discusses some implications of the study. In particular, we examine the potential resource and social effects of the Forest's unregulated camping policies for these areas.

Study Area

The Jefferson National Forest was established in 1936. In 1995, the USDA Forest Service combined the Jefferson and adjacent George Washington National Forests to form a single administrative unit. The results and discussion that follow refer to the Jefferson National Forest portion of the unit.

Situated in the Appalachian Mountains of southwestern Virginia, the Jefferson National Forest encompasses more than 1.6 million acres, 41% of which are federally owned. Forest overstory is classified as Appalachian hardwoods, comprising predominantly of upland oak and including poplar, hickory, pine and other hardwoods. The Forest is managed under a multiple-use and sustained-yield mandate designed to maximize the production of goods and services in an environmentally sound manner. Forest uses include timber, recreation, fisheries, wildlife, mineral and energy resources.

The Forest contains 11 wilderness areas with a total size of 57,760 acres (fig. 1). The Appalachian National Scenic Trail and Virginia Creeper National Recreational Trail traverse some parts of the wildernesses. More than 76,000 recreation visitor days (RVDs) were recorded for these wilderness areas in 1993 (Jefferson National Forest, unpublished statistics). About 70% of the total visitation was

In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. 2000. Wilderness science in a time of change conference—Volume 5: Wilderness ecosystems, threats, and management; 1999 May 23–27; Missoula, MT. Proceedings RMRS-P-15-VOL-5. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

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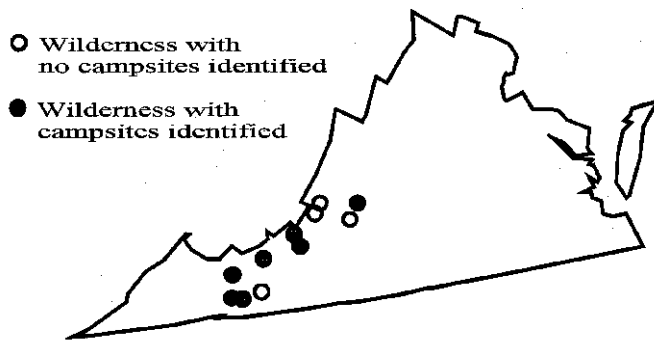


Figure 1—Location of the wilderness areas included in this study.

accommodated by three areas: Lewis Fork, Mountain Lake and Little Wilson Creek Wildernesses (table 1).

An unregulated or “at-large” camping policy has been adopted for these wilderness areas: camping is permitted throughout each area, unless otherwise posted as closed to visitor use. Overnight stay permits are not required. There is no limit on party size, though there is a 21-day limit on the total duration of overnight stays. Wood campfires are allowed. Information on minimum-impact recreation practices is available at ranger offices and visitor centers.

The Forest is in the process of implementing the Limits of Acceptable Change (LAC) planning framework in its wilderness areas. This study was initiated as part of the LAC process, which emphasizes the formulation of indicators and standards (Stankey and others 1985). An earlier survey was conducted by the Forest staff and reported by Marion (Marion 1991b). The current study was considered a refinement of the earlier survey, with substantial changes in survey procedures. It is not the intent of this paper to compare results from the two surveys.

Methods

This study included all 11 wilderness areas of the Jefferson National Forest, two of which fall within the boundaries of the Mount Rogers National Recreation Area (NRA). The high country non-wilderness zone of the Mount Rogers NRA

was also included. Only results from the wilderness areas are presented. The survey procedures were adapted from Marion (1991a), which combined condition class and multi-parameter IA&M approaches in order to document the numbers, distribution and resource conditions of campsites. Extensive searches along trail corridors and at potential use areas were conducted with the Forest staff to identify and locate campsites. A census was considered necessary to establish a baseline database and provide information for wilderness planning activities. At each campsite, boundaries were defined according to vegetation change, plant litter and local topography. Inventory indicators were recorded, including locational information (GPS coordinates and description), site position on slope, distance to water sources, distance to trails and visibility from trails or other campsites. Impact indicators were also assessed, which included site size (area of disturbance), number of fire sites, groundcover vegetation loss, soil exposure, trees with exposed roots, damage to tree trunks, tree stumps, human waste and human trash. Comprehensive descriptions of the field procedures are provided in the final management report (Leung and Marion 1995).

Results

The survey identified a total of 110 campsites distributed in seven wilderness areas. No campsites were identified in four wilderness areas (fig. 1); possible reasons for the lack of campsites include the relative inaccessibility of and low visitation to these four areas.

Nearly three-quarters of the campsites were located within sight of established trails (table 2). Over one-third of the campsites (38%) were located less than 25 feet from trails, another 27% were located between 25 and 100 feet from trails. Site intervisibility was mixed: While 59% of the sites had no other sites visible, 14% had one other site visible, 18% had two other sites visible, and 9% had three other sites visible (table 2). A substantial number of sites (70%) were somewhat distant (> 200 ft) from water sources, although one-quarter were located less than 100 feet. An example of uneven distribution of campsites is shown as figure 2. In the Lewis Fork Wilderness, the vast majority of campsites were located right along trail corridors or at trail junctions (fig. 2).

Table 1—Wilderness areas of the Jefferson National Forest included in this study.

Wilderness	Size	Visitation	Accessibility/level of facility
	<i>acres</i>	<i>RVD^a</i>	
Barbours Creek	5,382	2,650	Accessible; 1 maintained trail
Beartown	5,609	1,540	Very remote; no maintained trails
James River Face	8,886	4,466	Very accessible; 6 maintained trails
Kimberling Creek	5,542	1,320	Accessible; no maintained trails
Lewis Fork	5,618	25,350	Very accessible; several maintained trails
Little Dry Run	2,858	1,950	Very accessible; 1 maintained trail
Little Wilson Creek	3,613	11,700	Remote; 4 maintained trails
Mountain Lake	11,113	15,600	Very accessible; several maintained trails
Peters Mountain	3,328	9,200	Very accessible; several maintained trails
Shawvers Run	3,467	1,350	Accessible; no maintained trails
Thunder Ridge	2,344	1,334	Very accessible; one maintained trail

^aRecreation visitor days in 1993 (Jefferson National Forest, unpublished statistics).

Table 2—Number and percent of wilderness campsites for selected inventory indicators.

Inventory indicator	Wilderness campsites (N = 110)	
	Number	Percent
Site visibility from trail		
Yes	79	72
No	31	28
Distance to formal trail (ft)		
<25	41	38
25-100	30	27
101-200	19	17
>200	20	18
Other sites visible (#)		
0	65	59
1	15	14
2	20	18
3	10	9
Distance to water (ft)		
<25	9	8
25-100	18	16
101-200	6	6
>200	77	70

In addition, campsites tended to proliferate in close proximity to shelters, where water sources and flat grounds are usually available. This distribution pattern was common to other wilderness areas of the Forest.

Survey data revealed that 59% of the campsites were in condition classes 1 and 2, indicative of no discernible soil exposure onsite. However, groundcover vegetation loss was substantial in the James River Face and Lewis Fork Wildernesses, with mean losses of 57% and 60%, respectively. Most campsites were generally small in size; 67% of the sites were less than 500 ft². Damaged trees, root exposure and tree stumps were not serious problems on the

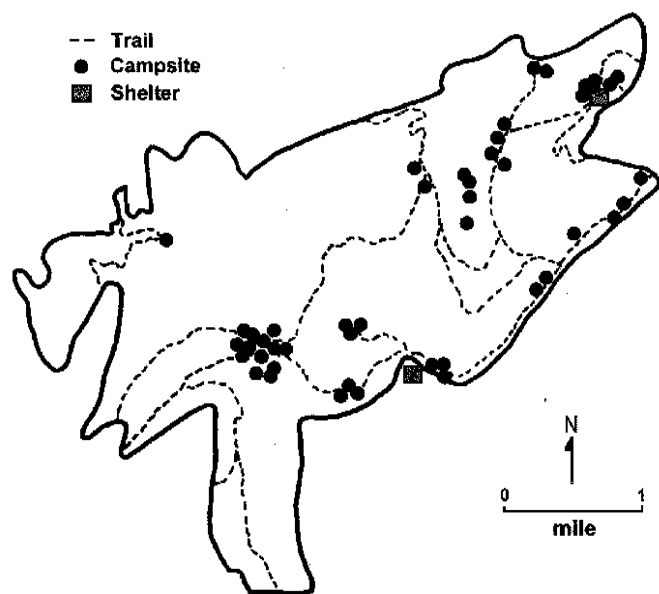


Figure 2—Spatial distribution and clustering of campsites in the Lewis Fork Wilderness.

majority of campsites (table 3). Except in the Beartown Wilderness, campsites tended to have large numbers of radiating social trails, which are indicative of potential problems with campsite expansion and proliferation, as reported in other more heavily visited wilderness areas (Cole 1993; Cole and others 1997).

The uneven distribution of visitation among wilderness areas was reflected by different levels of impact. Campsites in the Lewis Fork and Mountain Lake Wildernesses, the two most visited areas, received greater resource impact than other wilderness areas (tables 1 and 3). In particular, average campsite sizes in these two wilderness areas were larger, indicating a larger area of site disturbance, including groundcover loss and soil exposure.

With respect to aggregate impacts, the Lewis Fork Wilderness had the largest extent of impact on all three aggregate measures of site size, vegetation loss and soil exposure (table 4). Both the moderate level of impact intensity and the large number of campsites contributed to the larger aggregate impact measures.

Management Implications and Conclusions

The findings of this study show that some wildernesses in the Eastern U.S. may receive very low overnight visitation and associated resource impacts, despite the fact that they are relatively close to population centers. The inaccessibility and low use of these areas may facilitate restoration of vegetation and soil in the more resilient Eastern environment (Cole and Marion 1988).

The survey found several higher-use destination areas with larger numbers of campsites, some in tight clusters. Campsite locations reflect the site choices of visitors, as camping is unregulated in these wilderness areas. Although field staff conducted extensive searches of distant and hidden potential camping locations, our results reveal that a majority of campsites were located within sight of established trails. Only 20 (18%) of the campsites were found more than 200 feet from a trail. The Forest staff concurred with these findings, noting that relatively few visitors currently practice dispersed camping. However, due in part to more dense Eastern forest vegetation, campsite intervisibility was relatively low, though site clustering did occur in a few popular areas.

Survey findings suggest that visitors to these lower-use Eastern wilderness areas are not selecting campsites based on a desire for solitude or privacy. In particular, visitors who camp close to trails reduce the potential for solitude of both hikers and campers. Topography presents significant limitations in many areas: Mountainous terrain largely restricts camping to flat ground along stream drainages and on ridgetops. Trails are often routed along these topographic features as well, further limiting the ability of visitors to locate more distant camping locations. Novice visitors may fear getting lost if they venture too far from trails. Other visitors may simply take the first available campsite they see when they reach their destination. Trailside campsites may be more convenient to use than those requiring searches through difficult off-trail vegetation and terrain. Finally, proximity to an attractive destination location, water or the

Table 3—Mean conditions for selected inventory and impact indicators for campsites assessed in the wilderness areas.

Wilderness ^a	Number sites	Visible from trail	Site size	Indicator			
				Vegetation loss	Exp. soil	Damaged trees	Social trails
		%	ft ²	%	%	no.	no.
Beartown	5	100	338	0	0	0.4	0
James River Face	21	76	365	57	37	0.9	5
Lewis Fork	49	63	771	60	29	0.5	4
Little Wilson Creek	18	61	349	32	14	0	3
Mountain Lake	12	92	861	24	35	1.2	5
Peters Mountain	4	100	496	0	27	0.3	6

^aResults from the Kimberling Creek Wilderness were excluded due to insufficient sample size.

Table 4—Aggregate measures for selected impact indicators for campsites assessed in the wilderness areas.

Wilderness ^a	Sum of site size	Indicator sum of vegetation loss	Sum of soil exposure
		ft ²	
Beartown	1,690	0	0
James River Face	7,671	3,809	2,551
Lewis Fork	37,764	17,169	8,780
Little Wilson Creek	6,282	497	222
Mountain Lake	10,322	2,410	3,546
Peters Mountain	1,982	1,404	613
Total	65,711	25,289	15,712

^aResults from the Kimberling Creek Wilderness were excluded due to insufficient sample size.

trail may simply be more important than finding a camping location that enhances solitude.

An unregulated camping policy does provide the freedom and opportunity for visitors to locate a campsite that ensures their solitude while camping. Visitors could be encouraged to hike off-trail to discover a more distant and private campsite or location. However, a second group, one less concerned about solitude, might still show up after the tents are set up and camp close by. Educational efforts for wilderness visitors should address the issue of solitude, directing visitors to camp out of sight or at some minimum distance from other groups.

Campsite locations assessed in this study were generally neither resistant nor resilient to visitor impacts (Marion and Proudman 1999). Most campsites were located under forest canopies on fragile forest herbs; some were located close to streams. Soil from riparian zone campsites can be eroded directly into streams, contributing sediments to aquatic communities. However, with a few exceptions, campsites were generally small in size and in good condition. These findings are probably attributable to the relatively low use levels and small group sizes common to most of the wildernesses surveyed. Campsite expansion and proliferation were evident at several popular locations, as evidenced by large clusters of sites (fig. 2). Enlargement of some core sites was causing them to merge together to form excessively large

camping areas. Management responses are urgently needed for these areas. In particular, controlling the spatial growth of established campsites and minimizing the creation of new campsites at these high-use locations are needed to curb the expansion of resource impacts in these areas. A similar situation can be found in other parts of the country (Cole and others 1997; McEwen and others 1996).

As with the management of social problems, resource impact management under an unregulated camping policy is largely an issue of effective visitor education. In lower use travel zones, resource impacts can be minimized with a dispersed camping strategy that encourages visitors to select resistant pristine sites and employ *Leave No Trace* camping practices (National Outdoor Leadership School 1994). Managers have had relatively low success with dispersed camping, however, due to many of the previously discussed campsite selection factors. In addition, few areas have enough resistant flat locations to sustain such a strategy. Management experience and research suggest that a camping containment strategy minimizes resource impacts more effectively, particularly in moderate to heavy use areas. Educational materials can encourage visitors to use only well-established existing campsites. *Leave No Trace* camping practices, such as concentrating use and impact on the most resistant or disturbed surfaces, can also help reduce impacts. More discussion on these alternative impact management strategies can be found in Cole and others (1987) and Leung and Marion (1999).

This study demonstrates that data generated from campsite IA&M programs can inform and aid in management decision-making, particularly when evaluating the effectiveness of policies, strategies and actions in minimizing visitor impacts. The continuation of such programs is critical for providing timely feedback to wilderness managers who try to balance nature preservation and recreation.

Acknowledgment

Funding for this project was provided by the USDA Forest Service, Jefferson National Forest, the USDI National Biological Service and Virginia Tech Cooperative Park Studies Unit through a Challenge Cost-Share Agreement (#14-09-94-14). We appreciate the field assistance provided by the Forest staff and several volunteers.

References

- Cole, David N. 1993. Campsites in Three Western Wildernesses: Proliferation and Changes in Condition Over 12 to 16 Years. Research Paper INT-463. Ogden, UT: USDA Forest Service, Intermountain Research Station. 15p.
- Cole, David N.; Marion, Jeffrey L. 1988. Recreation impacts in some riparian forests of the eastern United States. *Environmental Management*. 12(1): 99-107.
- Cole, David N.; Petersen, Margaret E.; Lucas, Robert C. 1987. Managing Wilderness Recreation Use: Common Problems and Potential Solutions. General Technical Report INT-230. Ogden, UT: USDA Forest Service, Intermountain Research Station. 60p.
- Cole, David N.; Watson, Alan E.; Hall, Troy E.; Spildie, David R. 1997. High-Use Destinations in Wilderness: Social and Biophysical Impacts, Visitor Responses, and Management Options. Research Paper INT-RP-496. Ogden, UT: USDA Forest Service, Intermountain Research Station. 30p.
- Conrad, Richard 1997. National survey highlights agency training needs in the United States. *International Journal of Wilderness*. 3(4): 9-12.
- Kulhavy, David L.; Legg, Michael H. 1998. Wilderness and Natural Areas in Eastern North America: Research, Management and Planning. Nacogdoches, TX: Stephen F. Austin State University, Center for Applied Studies in Forestry. 321p.
- Landres, Peter; Meyer, Shannon 1998. National Wilderness Preservation System database. General Technical Report RMRS-GTR-18. Ogden, UT: USDA Forest Service, Rocky Mountain Research Station. 97p.
- Leung, Yu-Fai; Marion, Jeffrey L. 1995. A Survey of Campsite Conditions in Eleven Wilderness Areas of the Jefferson National Forest. Blacksburg, VA: USDI National Biological Service, Virginia Tech Cooperative Park Studies Unit. 79p.
- Leung, Yu-Fai; Marion, Jeffrey L. 1999. Spatial strategies for managing visitor impacts in national parks. *Journal of Park and Recreation Administration* 17(4): 20-38.
- Marion, Jeffrey L. 1991a. Developing a Natural Resource Inventory and Monitoring Program for Visitor Impacts on Recreation Sites: A Procedural Manual. Natural Resources Report NPS/NRVT/NRR-91/06. Denver, CO: USDI National Park Service, Natural Resources Publication Office. 59p.
- Marion, Jeffrey L. 1991b. Results from the Application of a Campsite Inventory and Impact Monitoring System in Eleven Wilderness Areas of the Jefferson National Forest. Blacksburg, VA: USDI National Park Service, Virginia Tech Cooperative Park Studies Unit. 73p.
- Marion, Jeffrey L.; Proudman, Robert D. 1999. May the forethought (and studies) be with your campsite protection planning! *The Register* 23(2):12-15.
- McEwen, Douglas; Cole, David N.; Simon, Mark 1996. Campsite Impacts in Four Wildernesses in the South-Central United States. Research Paper INT-RP-490. Ogden, UT: USDA Forest Service, Intermountain Research Station. 12p.
- National Outdoor Leadership School 1994. Leave No Trace Outdoor Skills and Ethics: Southeastern States. Lander, WY: National Outdoor Leadership School. 16p. (A series of LNT booklets are also available on the web at: <http://www.lnt.org/>).
- Stankey, George H.; Cole, David N.; Lucas, Robert C. and others 1985. The Limit of Acceptable Change (LAC) System for Wilderness Planning. General Technical Report INT-176. Ogden, UT: USDA Forest Service, Intermountain Research Station. 37p.
- Washburne, Randel F.; Cole, David N. 1983. Problems and Practices in Wilderness Management: A Survey of Managers. Research Paper INT-304. Ogden, UT: USDA Forest Service, Intermountain Forest and Range Experiment Station. 56p.
- Williams, Peter B.; Marion, Jeffrey L. 1995. Assessing Campsite Conditions for Limits of Acceptable Change Management in Shenandoah National Park. Technical Report NPS/MARSHEN/NRTR-95/071. Blacksburg, VA: USDI National Biological Service, Virginia Tech Cooperative Park Studies Unit. 138p.