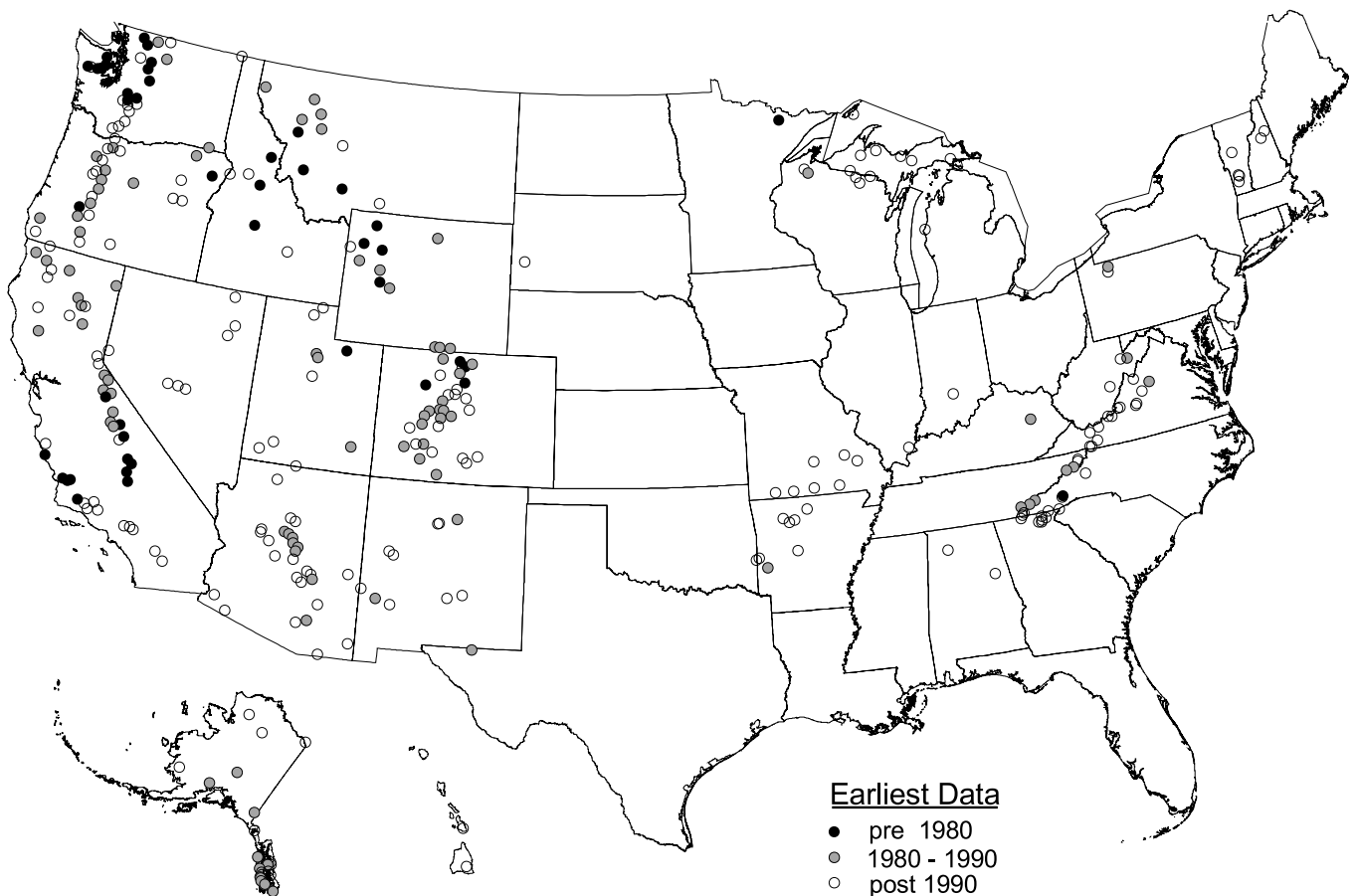




Wilderness Visitors and Recreation Impacts: Baseline Data Available for Twentieth Century Conditions

**David N. Cole
Vita Wright**



Abstract

Cole, David N.; Wright, Vita. 2003. **Wilderness visitors and recreation impacts: baseline data available for twentieth century conditions**. Gen. Tech. Rep. RMRS-GTR-117. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 52 p.

This report provides an assessment and compilation of recreation-related monitoring data sources across the National Wilderness Preservation System (NWPS). Telephone interviews with managers of all units of the NWPS and a literature search were conducted to locate studies that provide campsite impact data, trail impact data, and information about visitor characteristics. Of the 628 wildernesses that comprised the NWPS in January 2000, 51 percent had baseline campsite data, 9 percent had trail condition data and 24 percent had data on visitor characteristics. Wildernesses managed by the Forest Service and National Park Service were much more likely to have data than wildernesses managed by the Bureau of Land Management and Fish and Wildlife Service. Both unpublished data collected by the management agencies and data published in reports are included. Extensive appendices provide detailed information about available data for every study that we located. These have been organized by wilderness so that it is easy to locate all the information available for each wilderness in the NWPS.

Keywords: campsite condition, monitoring, National Wilderness Preservation System, trail condition, visitor characteristics

The Authors

David N. Cole is Research Biologist with the Aldo Leopold Wilderness Research Institute, Rocky Mountain Research Station, in Missoula, MT. He completed a B.A. degree in geography from the University of California, Berkeley, in 1972 and a Ph.D. degree in geography from the University of Oregon in 1977.

Vita Wright is Research Application Program Leader with the Aldo Leopold Wilderness Research Institute, Rocky Mountain Research Station, in Missoula, MT. She completed a B.S. degree in wildlife biology from the University of Montana, Missoula, in 1992 and an M.S. degree in organismal biology and ecology from the University of Montana in 1996.

Acknowledgments

Keith Vanderwielen conducted most of the telephone interviews, reviewed many of the publications and designed and compiled most of the database. Nicole Miller also conducted interviews and reviewed publications. Dave Spildie assisted in the creation of the maps. We appreciate their work. We also appreciate the assistance of all those wilderness managers who provided us with information.

Contents

	Page
Introduction	1
Methods	2
Baseline Recreation Data for the National Wilderness Preservation System	3
Wilderness Campsite Data	3
Wilderness Trail Data	6
Wilderness Visitor Characteristics Data	8
Wildernesses with the Most Complete Data	10
Conclusions	13
References	13
Appendix A: Baseline data available (campsite impact, trail impact, and visitor impact)	14
Appendix B: Campsite impact data available	25
Appendix C: Trail impact data available	33
Appendix D: Visitor impact data available	35
Appendix E: References for published campsite, trail, and visitor studies	44

You may order additional copies of this publication by sending your mailing information in label form through one of the following media. Please specify the publication title and number.

Telephone	(970) 498-1392
FAX	(970) 498-1396
E-mail	rschneider@fs.fed.us
Web site	http://www.fs.fed.us/rm
Mailing Address	Publications Distribution Rocky Mountain Research Station 240 West Prospect Road Fort Collins, CO 80526

Wilderness Visitors and Recreation Impacts: Baseline Data Available for Twentieth Century Conditions

David N. Cole
Vita Wright

Introduction

The Wilderness Act of 1964 established a National Wilderness Preservation System (NWPS) “to secure for the American people of present and future generations the benefits of an enduring resource of wilderness.” The Act states that wilderness areas shall be administered “for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness.” Moreover, it is the responsibility of each agency that administers wilderness to preserve each area’s “wilderness character.” Since 1964, more than 100 pieces of legislation have created an NWPS of over 100 million acres, in well over 600 individual wildernesses, administered by the U.S. Department of the Interior’s Bureau of Land Management (BLM), Fish and Wildlife Service (FWS), and National Park Service (NPS); and the U.S. Department of Agriculture’s Forest Service (FS).

To provide for the use and enjoyment of these areas, while preserving their wilderness character, it is important for management agencies to monitor wilderness recreation visitors and the impacts they cause. Some people state that the Wilderness Act mandates that recreation impacts not be allowed to increase following wilderness designation (Worff 2001). Ideally, baseline conditions should be inventoried at the time each area is designated as wilderness and added to the NWPS, and then periodically monitored in the future to assess trends in conditions and the efficacy of existing recreation management programs. Such data will become increasingly valuable to future attempts to evaluate trends in the wilderness character of each area in the NWPS.

Although baseline recreation conditions have been inventoried in many wildernesses, such data are lacking in many others. Moreover, the distribution of wildernesses with baseline recreation data is not equitable across the nation or the four agencies that manage wilderness. This report is an assessment of

the status of baseline recreation monitoring data for all wildernesses in the NWPS at the end of the twentieth century. It documents the proportion of the NWPS that has baseline data on recreation visitors and impacts, which wildernesses have this data, and where they are located. It identifies the types of data that have been collected, the types of sampling designs that have been employed, and how and where data have been stored. This compilation should help researchers identify wildernesses where trends can be assessed and help wilderness managers identify other managers who might be contacted about how to initiate and implement new studies.

The data listed in this report (subject to inevitable but hopefully minor errors of omission) are all we will ever have to gain perspective on the condition of designated wilderness in the twentieth century regarding recreation visitors and impacts. Because managers and the interested public, in future decades and centuries, will want to know what these places were like, these data will become increasingly valuable. Although some of the data are published in reports or have been carefully archived, most are stored on paper files in ranger offices, where they are vulnerable to loss. We strongly encourage agency personnel to recognize the future value of this data and invest in archiving it in such a manner that its perpetuation is ensured. These data could be the basis for valuable assessments of recreation and impact trends across the NWPS.

This report begins with an overview of the status of recreation-related monitoring across the NWPS. Three types of studies are surveyed: those that provide (1) campsite impact data, (2) trail impact data, and (3) information about visitor characteristics. Most of the report consists of appendices (A through E) that present all the recreation monitoring data we located that had been conducted in each wilderness prior to 2000. This report and the original database are available on the Internet (<http://leopold.wilderness.net>).

Methods

The process of compiling this information began in January 1999 with a letter and one-page questionnaire sent to administrators of each of the 625 wildernesses in the NWPS. Over the next year, three additional wildernesses were designated, bringing the total that we surveyed to 628. We sent the questionnaire to 34 BLM field offices and resource areas responsible for administration of the 134 BLM wildernesses. We sent the questionnaire to 360 FS ranger districts responsible for the 400 FS wildernesses, to 64 FWS refuges responsible for the 71 FWS wildernesses, and to 44 NPS parks responsible for the 44 NPS wildernesses. (Note that additional wildernesses have been designated since we completed information collection on January 1, 2000, and that these numbers total more than 625 wildernesses due to 21 wildernesses that are managed by two different agencies.)

The questionnaire asked whether any recreation baseline data had ever been collected in any of the wildernesses managed by that office, either by the management agency or by someone else (such as an academic institution). We described the types of data we were interested in: (1) campsite impact data, (2) trail impact data (described as data on trail impact—not a prescriptive trail log that notes trail locations that need work), and (3) wilderness visitor data (described as information about the visitors and their trips—not data on amount of use). If respondents stated that no data of any of the three types had ever been collected, we accepted that response. From the BLM we received nine “no data” responses. We received 29 “no data” responses from the FS, 40 from the FWS, and seven from the NPS. However, a substantial number of people did not respond to our questionnaire. Moreover, after interviewing many of those who responded that they had data, we concluded that their data did not meet our criteria for inclusion.

We conducted phone interviews with all the administrators who either responded that they had data or who did not respond to our questionnaire. Between March 1999 and January 2000, we conducted 15 interviews with the BLM, 331 with the FS, 22 with the FWS, and 37 with the NPS. Ultimately, we conducted phone interviews with managers of every wilderness in the NWPS, except those who indicated on the questionnaire that they had no data. In all cases we asked to speak with the person most familiar with wilderness management. In the BLM, we spoke with recreation and wilderness planners, as well as with State office wilderness coordinators. In the FS, we spoke most frequently with district recreation and wilderness managers, but also with planners, foresters, resource officers, trail personnel, district rangers, and occasionally forest staff. In the FWS, we spoke

with refuge managers and assistant managers, and occasionally with someone with recreation or wilderness in their title. In the NPS, we spoke most frequently with resource management specialists, but sometimes with district or wilderness rangers and occasionally with a planner, science advisor, naturalist, or superintendent.

In each interview, we began by establishing whether data met our criteria for inclusion. Sometimes data were collected in such a nonsystematic manner that we decided not to include them. However, for this criterion we erred on the side of inclusion and simply noted that the sample was an opportunistic one. There were two other common reasons for excluding data. First, in many wildernesses, trails are inventoried and information is collected on the location of existing improvements (for example, drainage devices or bridges) and segments that need maintenance or improvement. We only included trail studies if they had data on recreation impacts on trails. Relatively few wildernesses have such data.

Second, many wildernesses have systematically collected data on amount of recreation use but have no baseline data on visitor characteristics. Data on amount of wilderness recreation use, prior to 1995, are compiled in Cole (1996). For purposes of this report, however, we only included wilderness visitor studies if they had data on more than amount of use. Our criteria for campsite data were less stringent than for trail and visitor data. We included wilderness campsite studies even if the only data collected were campsite locations. Virtually all wildernesses had maps of the locations of the trails in their official trail system.

In addition to interviewing agency managers, we searched for data that had been published in such outlets as journals, proceedings, theses, and reports. For this purpose, we conducted extensive literature searches. Many publications were located by examining the literature cited in other papers and reports. We also had access to the library of the Aldo Leopold Wilderness Research Institute, including the personal collections of early wilderness scientists Bob Lucas and George Stankey. Ultimately, we located over 300 publications that contained baseline data about wilderness campsite impacts, wilderness trail impacts, or wilderness visitors. We undoubtedly missed a few relevant publications but believe we have captured almost all of the relevant studies published by 2000. When there were multiple publications from the same study, we included more than one publication if they were substantially different. In the tables that follow, if there are multiple publications from the same study, they are treated as if there were multiple studies. Consequently, the number of studies is inflated somewhat. Readers specifically interested in the Boundary Waters Canoe Area Wilderness should consult the

bibliography of research compiled by Lime and others (1990). Although we use the term “monitoring data” throughout this report, much of this data has been collected in research projects.

For each type of baseline data, we collected information about when the studies were conducted, how the data are stored, and where they are stored. We asked questions about the survey sample. Sometimes data were collected across the entire wilderness. In other cases, data were only applicable to a portion of the wilderness or to a specific situation (such as visitors to heavily used trailheads or campsites that are highly impacted). We also asked questions about the type of data that were collected (for example, photopoints, condition classes, or detailed measures). This detailed information should be helpful both to characterize the types of studies that have been conducted across the NWPS and to provide the specifics of a particular study in a wilderness of interest.

Baseline Recreation Data for the National Wilderness Preservation System

Over one-half of the wildernesses in the NWPS (56 percent) had baseline recreation data of some type (table 1). The agency was a much better predictor of whether baseline recreation data had been collected than region of the country. Most Forest Service (77 percent) and National Park Service (66 percent) wildernesses had data; few Bureau of Land Management (17 percent) and Fish and Wildlife Service (10 percent) wildernesses had data. The Southwest (Arizona, Nevada, New Mexico, and Utah) was the only region in which a majority of wildernesses had no data (table 2). The region with the largest proportion of wildernesses with data was the Rocky Mountains (Colorado, Idaho, Montana, and Wyoming).

Campsite data were the most frequently collected type of baseline recreation data. Based on our criteria, about one-half of the wildernesses in the NWPS (51 percent) had baseline campsite data (table 1). About one-quarter of wildernesses (24 percent) had visitor data, and only 9 percent had trail condition data. Forest Service and National Park Service wildernesses were much more likely than Bureau of Land Management or Fish and Wildlife Service wildernesses to have each of these three types of data. Forest Service wildernesses were more likely than National Park Service wildernesses to have campsite data, while National Park Service wildernesses were more likely to have visitor and trail condition data. Wildernesses in the Rocky Mountain States were most likely to have each of these types of data (table 2). Wildernesses in the southwest were least likely to have campsite data. Wildernesses in the Southwest, Pacific States and Alaska were least likely to have visitor data, while wildernesses in the Central and Northeast States and Hawaii were least likely to have trail data.

Wilderness Campsite Data

Although about one-half of the 628 wildernesses in the NWPS in 2000 had some type of baseline data on campsite conditions, just over one-third (37 percent) had data for all the campsites in the wilderness (table 3). Another 5 percent had data for a sample of campsites considered to be representative of all campsites in the wilderness. About 4 percent had data for all the campsites in a portion of the wilderness, while another 5 percent had data for a sample that was representative of a specific type of campsite. In most cases, the specific types of campsite that were surveyed were heavily used campsites. Campsites in riparian areas, along trails, and in lake basins were also subjects of focused efforts in some wildernesses, as were designated campsites, outfitter sites, and illegal sites. Research studies

Table 1—Number (percent) of wildernesses with any baseline recreation data, campsite data, trail data, or visitor data. Values are for each agency and for all wildernesses.

Agency	Type of data			
	Any	Camp	Trail	Visitor
Bureau of Land Management	23 (17)	21 (16)	3 (2)	8 (6)
Fish and Wildlife Service	7 (10)	4 (6)	1 (1)	4 (6)
Forest Service	308 (77)	291 (73)	46 (12)	122 (31)
National Park Service	29 (66)	22 (50)	9 (20)	20 (45)
All Wildernesses ^a	349 (56)	321 (51)	56 (9)	148 (24)

^aBecause some wildernesses are managed by multiple agencies, the sum of the wildernesses managed by each agency exceeds the total number of wildernesses.

Table 2—Number (percent) of wildernesses in each region and State^a with any baseline recreation data, campsite data, trail data, or visitor data.

Region/State	Type of data			
	Any	Camp	Trail	Visitor
Alaska	26 (54)	23 (48)	4 (8)	5 (10)
Hawaii	2 (100)	1 (50)	0 (0)	2 (100)
Pacific	107 (54)	101 (51)	18 (9)	35 (18)
California	52 (40)	46 (35)	7 (5)	18 (14)
Oregon	30 (77)	30 (77)	6 (15)	9 (23)
Washington	26 (87)	26 (87)	5 (17)	9 (30)
Rocky Mountain	61 (82)	59 (80)	11 (15)	32 (43)
Colorado	34 (89)	34 (89)	3 (8)	15 (39)
Idaho	6 (100)	6 (100)	1 (17)	4 (67)
Montana	11 (73)	11 (73)	3 (20)	9 (60)
Wyoming	12 (80)	11 (73)	5 (33)	5 (33)
Southwest	59 (41)	54 (38)	8 (6)	20 (14)
Arizona	28 (31)	28 (31)	2 (2)	8 (9)
Nevada	7 (47)	7 (47)	0 (0)	0 (0)
New Mexico	12 (52)	10 (43)	4 (17)	3 (13)
Utah	13 (81)	10 (63)	2 (13)	10 (63)
Central	39 (55)	34 (48)	4 (6)	27 (38)
Arkansas	7 (58)	7 (58)	0 (0)	2 (17)
Illinois	5 (63)	1 (13)	0 (0)	5 (63)
Indiana	1 (100)	1 (100)	1 (100)	1 (100)
Louisiana	0 (0)	0 (0)	0 (0)	0 (0)
Michigan	9 (64)	9 (64)	0 (0)	2 (14)
Minnesota	1 (33)	1 (33)	0 (0)	1 (33)
Missouri	7 (88)	7 (88)	0 (0)	7 (88)
Nebraska	1 (50)	0 (0)	0 (0)	1 (50)
NorthDakota	0 (0)	0 (0)	0 (0)	0 (0)
Oklahoma	2 (67)	2 (67)	1 (33)	1 (33)
SouthDakota	1 (50)	1 (50)	1 (50)	1 (50)
Texas	2 (33)	1 (17)	1 (17)	2 (33)
Wisconsin	5 (83)	5 (83)	0 (0)	4 (67)
Northeast	14 (54)	12 (46)	2 (8)	9 (35)
Maine	1 (33)	0 (0)	0 (0)	1 (33)
Massachusetts	0 (0)	0 (0)	0 (0)	0 (0)
New Hampshire	3 (75)	2 (50)	0 (0)	3 (75)
New Jersey	0 (0)	0 (0)	0 (0)	0 (0)
New York	0 (0)	0 (0)	0 (0)	0 (0)
Ohio	0 (0)	0 (0)	0 (0)	0 (0)
Vermont	4 (67)	4 (67)	0 (0)	1 (17)
West Virginia	4 (67)	4 (67)	2 (33)	3 (50)
Southeast	41 (51)	37 (46)	9 (11)	19 (23)
Alabama	2 (67)	2 (67)	0 (0)	2 (67)
Florida	2 (12)	0 (0)	0 (0)	2 (12)
Georgia	11 (79)	9 (64)	3 (21)	6 (43)
Kentucky	1 (50)	1 (50)	1 (50)	0 (0)
Mississippi	0 (0)	0 (0)	0 (0)	0 (0)
North Carolina	6 (50)	6 (50)	1 (8)	4 (33)
South Carolina	1 (14)	1 (7)	0 (0)	1 (7)
Tennessee	10 (91)	10 (91)	1 (9)	3 (27)
Virginia	14 (78)	14 (78)	4 (22)	6 (33)

^aBecause some wildernesses are in multiple States, the sum of the wildernesses in each State exceeds the number of wildernesses in each region.

Table 3—Number of wildernesses (percent of 628 wildernesses) with baseline campsite data of various types.

Sample type		
All campsites in the entire wilderness	234	(37)
All campsites in a portion of but not the entire wilderness	22	(4)
Only a sample of sites representative of the entire wilderness	32	(5)
Only a sample of a particular type of campsite	29	(5)
Only an opportunistic sample of campsites	9	(1)
Data characteristics		
Detailed measures	116	(18)
Categorical ratings or quick measures but not detailed measures	150	(24)
Condition class ratings but no individual impact parameters	12	(2)
Photopoints but no quantitative data	12	(2)
Only locations of campsites	31	(5)
Data entered into a geographic information system	69	(11)

often stratify campsites according to amount of use or vegetation type. Finally, another nine wildernesses (1.5 percent) only had data for an opportunistic sample of sites.

A wide variety of campsite monitoring techniques is available (Cole 1989). The easiest technique is simply to map the location of sites. In 31 of the wildernesses with campsite data, location was the only information collected (table 3). Another 12 wildernesses also had established photopoints at campsites. In 12 wildernesses, condition class ratings had been assigned to campsites, most frequently using the Frissell system (Frissell 1978), but no site measurements had been taken. In 150 wildernesses, multiple impact parameters had been evaluated, but evaluations consisted of either categorical ratings or quick measures. The most common approaches included those applied by Cole in the Bob Marshall Wilderness (Cole 1983) and by Marion and his students in such places as the

Shenandoah Wilderness (Leung and Marion 1999a). Finally, 116 wildernesses had detailed measures of multiple impact parameters, the most precise and expensive data.

In most cases, monitoring data were stored in paper format. Campsite condition data had been entered into a computer in only about 20 percent of these wildernesses. In many of the wildernesses where data had been entered into a computer (69 wildernesses), campsite condition data was stored in a geographic information system.

In a number of wildernesses, campsite condition data had been collected in more than one study. Table 4 describes the relative frequency of sample types and data characteristics for the 591 campsite studies that had been conducted in wilderness. Studies of all the campsites in the entire wilderness were most common. Studies that utilize samples, either of all campsites or a particular type of campsite, were also common.

Table 4—Number (percent) of 591 wilderness campsite studies of various types.

Sample type		
All campsites in the entire wilderness	324	(55)
All campsites in a portion of the wilderness	64	(11)
Sample of sites representative of the entire wilderness	91	(15)
Sample of a particular type of campsite	86	(15)
Opportunistic sample of campsites	26	(4)
Data characteristics		
Detailed measures	183	(31)
Categorical ratings or quick measures	467	(79)
Condition class ratings	249	(42)
Photopoints	209	(35)

Many studies utilized several different classes of data (for example, combining condition class ratings with either detailed measures or quick measures). The most common data class, collected in 79 percent of studies, was categorical ratings or quick measures of multiple impact parameters. In this approach, information is collected for many individual impact parameters (for example, tree damage, campsite area, and vegetation loss), but this information is less precise than if it were collected using detailed measures. Condition class ratings or photopoints were used in 42 percent and 35 percent of studies, respectively. Detailed measures of campsite impact were taken in 31 percent of the studies.

The earliest campsite data were collected in the early 1960s on samples of campsites in the Mt. Rainier and Glacier Peak Wildernesses (Thornburgh 1962) and the Boundary Waters Canoe Area (Frissell 1963). The first surveys of campsites across entire wildernesses were conducted in the early 1970s in the Yosemite and Olympic Wildernesses. In 44 wildernesses (7 percent of the NWPS), some baseline campsite data had been collected prior to 1980 (fig. 1). By 1990, baseline campsite data had been collected in 136 wildernesses (21 percent of the NWPS). This increased to 321 wildernesses (50 percent of the NWPS) by 2000.

Wilderness Trail Data

Most wildernesses had data on the extent of their official trail system, and many managers periodically

monitor the location of places that required some sort of “improvement” (such as a water bar or bridge). However, only about 9 percent of wildernesses had baseline assessments of the condition of the trail system (such as condition class or measures of trail depth and erosion). Twenty-six wildernesses (4 percent) had baseline data for all official trails in the entire wilderness, and another eight wildernesses (1.3 percent) had data for a sample representative of all official trails (table 5). Five wildernesses (0.9 percent) had data for a portion of the wilderness, and 14 wildernesses (2.2 percent) had data for a sample of a particular type of trail. Problematic trail segments and social trails were the most common particular types of trail that were studied. Sometimes a specific trail (Appalachian Trail, Continental Divide Trail) or fragile vegetation type was the subject of the study. Finally, four other wildernesses had only an opportunistic sample of trails. Seventeen wildernesses (2.7 percent) had data for social trails that develop informally as a result of user traffic.

Trail condition data can be collected using either a census or sampling-based approach (Leung and Marion 2000). In 21 wildernesses, data were collected continuously along the entire trail system (table 5). In 15 wildernesses, data were collected continuously along sample trail segments. In 24 wildernesses, information was collected at sample points located at specific intervals along the trail. Each of these approaches can provide valid data, although there are differences in precision and in the types of information that can be

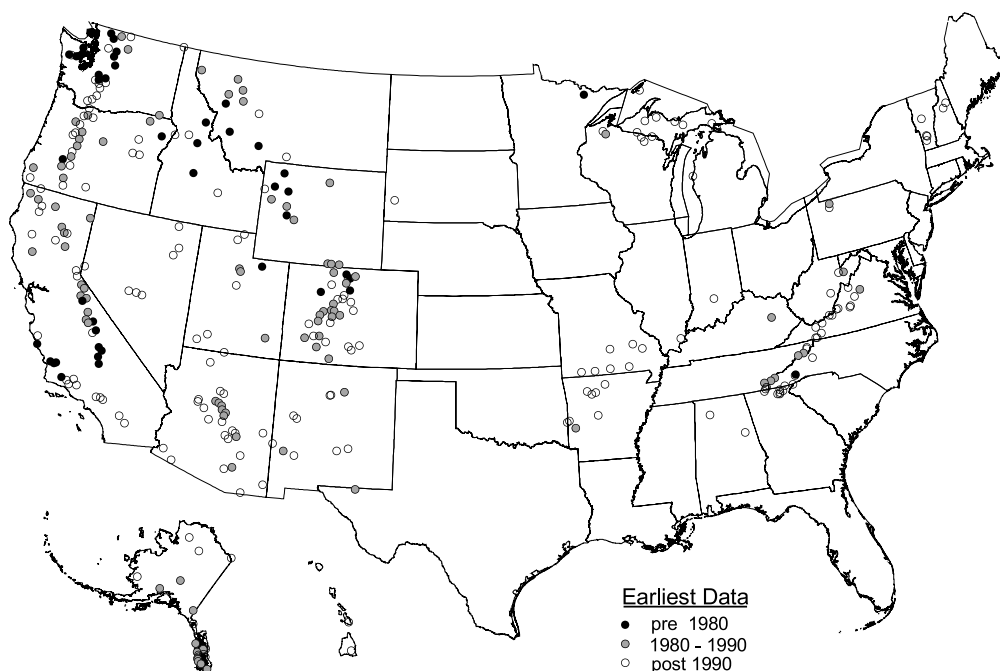


Figure 1—Earliest data for wildernesses with campsite data.

Table 5—Number of wildernesses (percent of 628 wildernesses) with baseline trail data of various types.

Sample type		
All official trails in the entire wilderness	26	(4)
All official trails in a portion but not the entire wilderness	5	(1)
Only a sample of trails representative of all trails	8	(1)
Only a sample of a particular type of trail	14	(2)
Only an opportunistic sample of trails	4	(1)
Data collected on social (user-built) trails	17	(3)
Sample technique		
Continuous measures along the entire trail	21	(3)
Continuous measures along sample trail segments	15	(2)
Measures at sample points along the trail	24	(4)
Data characteristics		
Data on impact severity	24	(4)
Data on spatial extent of impact	22	(4)
Condition class ratings but not any measures	15	(2)
Photopoints but no quantitative data	14	(2)
Data entered into geographic information system	9	(1)

collected (Leung and Marion 1999b). In three wildernesses, both census and sampling-based methods were used.

In 14 of the wildernesses with trail information, photopoints were all that was available (table 5). In another 15 wildernesses, condition class ratings were assigned to trails, but no measures were taken. In the remaining wildernesses with trail data, measures of trail condition were taken. In 22 wildernesses, measures of the spatial extent of impact (for example, the number of occurrences of erosion or the length of trail

with muddiness problems) had been taken. Measures of the severity of impact (for example, trail depth) had been taken in 24 wildernesses.

As was the case with campsite data, trail data were most commonly stored in paper format. About one-third of wildernesses with trail data had their data entered into a computer. For nine wildernesses, data were stored in a geographic information system.

Table 6 describes the relative frequency of sampling approaches and data characteristics for the 70 trail studies that had been conducted in wilderness.

Table 6—Number (percent) of 70 wilderness trail studies of various types.

Sample type		
All official trails in the entire wilderness	27	(39)
All official trails in a portion of the wilderness	7	(7)
Sample of trails representative of all trails	11	(16)
Sample of a particular type of trail	21	(30)
Opportunistic sample of trails	6	(9)
Social (user-built) trails	20	(29)
Sample technique		
Continuous measures along the entire trail	22	(31)
Continuous measures along sample trail segments	15	(21)
Measures at sample points along the trail	30	(43)
Data characteristics		
Impact severity	33	(47)
Spatial extent of impact	22	(31)
Condition class ratings	21	(30)
Photopoints	26	(37)

Studies of all the trails in the entire wilderness were most common. Studies that utilize samples of a particular type of trail were also common. The distribution of studies across sampling types was rather equitable. Studies based on sample points were somewhat more common than studies that used either of the census-based approaches. Measures of impact severity and spatial extent, condition class ratings, and photopoints were all commonly collected classes of data. Many studies collected several of these classes of data (for example, combining condition class ratings with either measures of impact severity and/or spatial extent). Seventeen studies combined measures of severity with measures of spatial extent. Condition class ratings were combined with measures of spatial extent in five studies and with measures of impact severity in one study.

The earliest reported data on trail condition were photopoints taken in the 1960s on problem trail segments in the North Absaroka and Washakie Wildernesses. The earliest measures of trail condition were collected in the early 1970s on selected trail segments in the Lee Metcalf (Dale 1973) and Selway-Bitterroot (Helgath 1974) Wildernesses. The first survey of trails across an entire wilderness was also conducted in the early 1970s in the Yosemite Wilderness. In 11 wildernesses (1.8 percent of the NWPS), some baseline trail data had been collected prior to 1980 (fig. 2). By 1990, baseline trail data had been collected in 23 wildernesses (3.7 percent of the NWPS). This increased to 56 wildernesses (9 percent of the NWPS) by 2000.

Wilderness Visitor Characteristics Data

Although about one-quarter of the 628 wildernesses in the NWPS in 2000 had some type of baseline data on characteristics of their visitors, only 17 percent (107 wildernesses) had data representative of the entire wilderness (table 7). Another 3 percent had data for all the visitors in a portion of the wilderness. Finally, another 4 percent had data that was collected in an opportunistic manner. In most of the wildernesses with baseline visitor data, only main-season visitors were included in studies. Information on off-season visitors was available for 47 wildernesses. In most visitor studies, all of the common modes of travel that occur in that wilderness were included. Hikers, visitors traveling with packstock, and water-based users were included in studies conducted in 135, 95, and 14 wildernesses, respectively. Occasionally visitor studies focused on either day visitors or, more commonly, overnight visitors. Consequently, overnight users were included in studies in 130 wildernesses, while day visitors were included in studies in 125 wildernesses.

Many of these visitor studies had been conducted by academic institutions rather than management agencies. Results of such studies were often carefully analyzed and reported. Written reports were available for 373 (93 percent) of visitor studies. However, the original data were often not carefully archived. With only a few exceptions, the data from these studies had not been stored in electronic format, with copies located with the management agency.

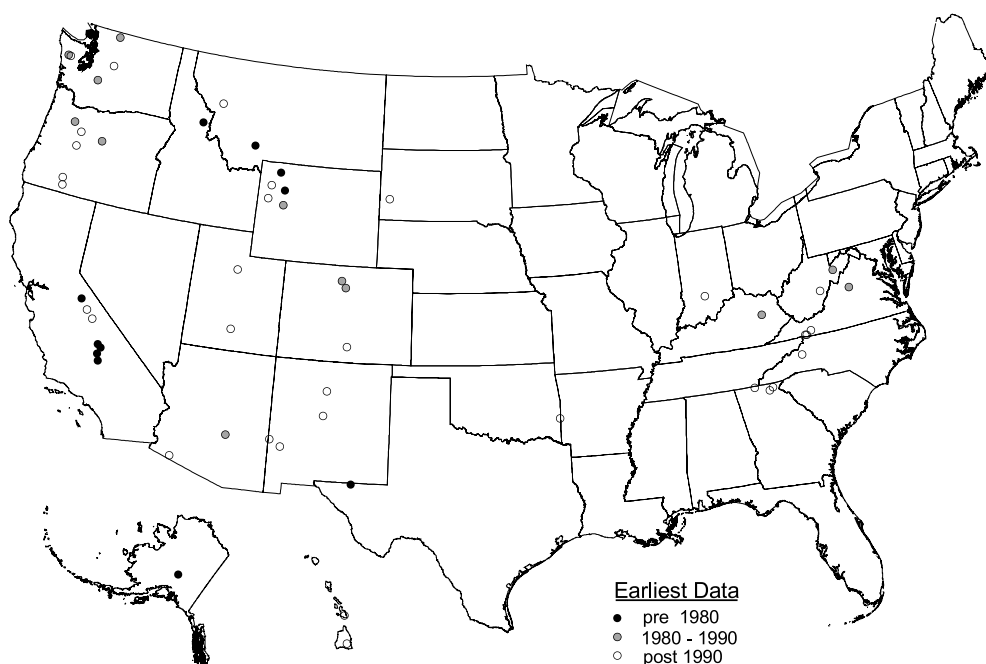


Figure 2—Earliest data for wildernesses with trail condition data.

Table 7—Number of wildernesses (percent of 628 wildernesses) with baseline visitor characteristic data of various types.

Sample type		
Visitors to the entire wilderness	107	(17)
Visitors to a portion but not the entire wilderness	18	(3)
Only an opportunistic sample of visitors	23	(4)
Data characteristics		
Main-season visitors included	139	(22)
Off-season visitors included	47	(7)
Hikers included	135	(21)
Stock users included	95	(15)
Water-based users included	14	(2)
Overnight visitors included	130	(21)

Visitors had been studied multiple times in a number of different wildernesses. Consequently, there were more than twice as many visitor studies (397 studies) as there were wildernesses with data on visitor characteristics. Visitors to the Boundary Waters Canoe Area Wilderness had been the focus of at least 20 different studies. Table 8 describes the relative frequency of sampling approaches and data characteristics for the 397 visitor studies that had been conducted in wilderness. Studies that aim to represent visitors to the entire wilderness were more common than studies that focus on a portion of the wilderness. Main-season visitors, hikers, and overnight visitors were almost always included in studies. Off-season visitors were included in 62 studies (16 percent), but data were presented separately for main- and off-season visitors in only seven studies (2 percent). Thus,

there is little insight into differences between these two visitor groups. Stock users and water-based users were included in 195 studies (49 percent) and 52 studies (13 percent), respectively, but the characteristics of visitors using different travel modes were presented separately in only 50 studies (13 percent). Day visitors were included in 285 studies (72 percent), but they were differentiated from overnight visitors in only 49 studies (12 percent).

The earliest data on wilderness visitors were collected in the late 1950s in the Boundary Waters Canoe Area Wilderness (Taves and others 1960). In 1960, data were collected in the Bob Marshall, John Muir, and Gila Wildernesses (Wildland Research Center 1962). In 42 wildernesses (7 percent of the NWPS), some baseline data on wilderness visitors had been collected prior to 1980 (fig. 3). By 1990, baseline

Table 8—Number (percent) of 397 wilderness visitor studies of various types.

Sample type		
Visitors to the entire wilderness	239	(60)
Visitors to a portion of the wilderness	106	(27)
Opportunistic sample of visitors	50	(13)
Data characteristics		
Main-season visitors included	377	(95)
Off-season visitors included	62	(16)
Main- and off-season visitors compared	7	(2)
Hikers included	344	(87)
Stock users included	195	(49)
Water-based users included	52	(13)
Different travel modes compared	50	(13)
Day visitors included	285	(72)
Overnight visitors included	365	(92)
Lengths of stay compared	49	(12)

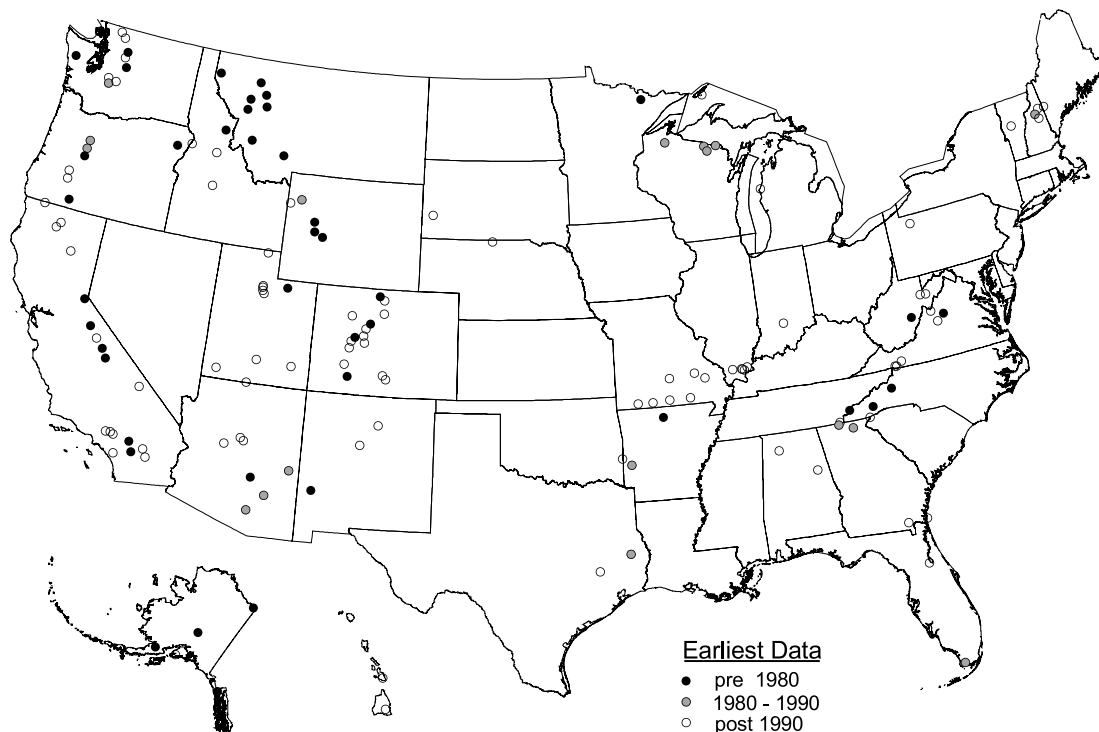


Figure 3—Earliest data for wildernesses with visitor data.

visitor data had been collected in 59 wildernesses (10 percent of the NWPS). This increased to 148 wildernesses (24 percent of the NWPS) by 2000.

Wildernesses with the Most Complete Data

For each of the three types of baseline recreation data, we developed criteria for what we considered to be relatively complete and informative data. For campsite data, the criteria were that all campsites in the entire wilderness were surveyed and that the data collected included some sort of quantification (condition class ratings, categorical ratings or measures). Using these criteria, 211 wildernesses (34 percent) had relatively complete, informative baseline data for campsite conditions. Wildernesses with complete campsite data were well distributed throughout the country (fig. 4b). They were most underrepresented in desert and coastal environments. Lack of data for wildernesses in these environments might be partially explained by the low levels of recreation use in wildernesses in these environments. Wildernesses in the central and northeastern portions of the country also were less likely to have complete campsite data.

The criteria we selected for trail data were that all official trails in the wilderness be surveyed and that data collected included some sort of quantification (condition class ratings or measures of spatial extent or

impact severity). Using these criteria, 16 wildernesses (2.5 percent) had relatively complete, informative baseline data for trail conditions. For large portions of the country, no wildernesses had complete data on trail impacts (fig. 4c).

The criteria we selected for visitor characteristics data were that the sample obtained was representative of visitors to the entire wilderness and that general questions about the visitor population were asked. Some studies had only a unique focus (for example, visitor response to fire) and contained no general information on visitor characteristics. Such studies were not counted. Using these criteria, 95 wildernesses (15 percent) had relatively complete, informative baseline data for wilderness visitor characteristics. Wildernesses with complete visitor data were well distributed throughout the country (fig. 4d). As was the case with campsite data, wildernesses in desert and coastal environments had been less frequently studied.

Only five wildernesses met the criteria for all three types of data. Four of these were small Forest Service Wildernesses: Black Elk (South Dakota), Linville Gorge (North Carolina), Lewis Fork (Virginia), and Little Wilson Creek (Virginia). The fifth wilderness was the much larger Yosemite Wilderness (California), which is managed by the National Park Service. Another 72 wildernesses (11 percent of the NWPS) met these criteria for two of the data types. Eight of these wildernesses

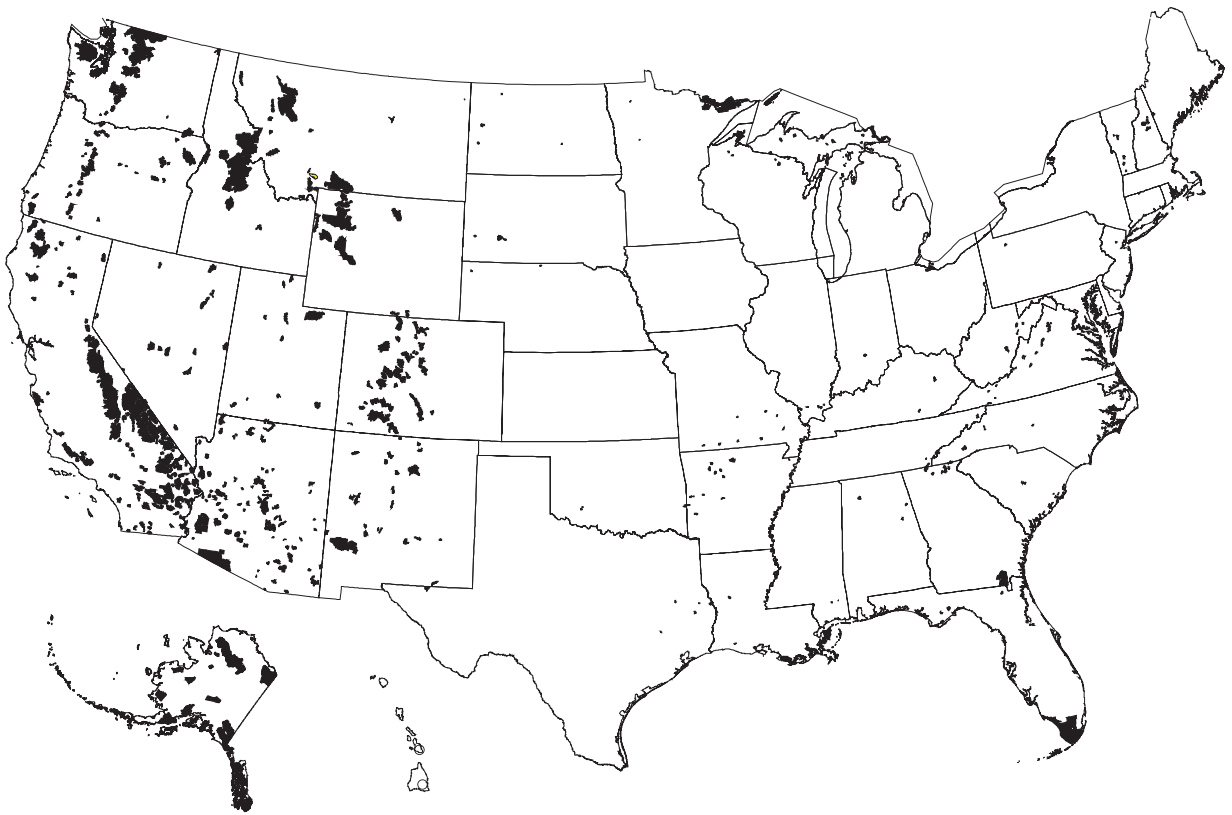


Figure 4a—Extent of the National Wilderness Preservation System.

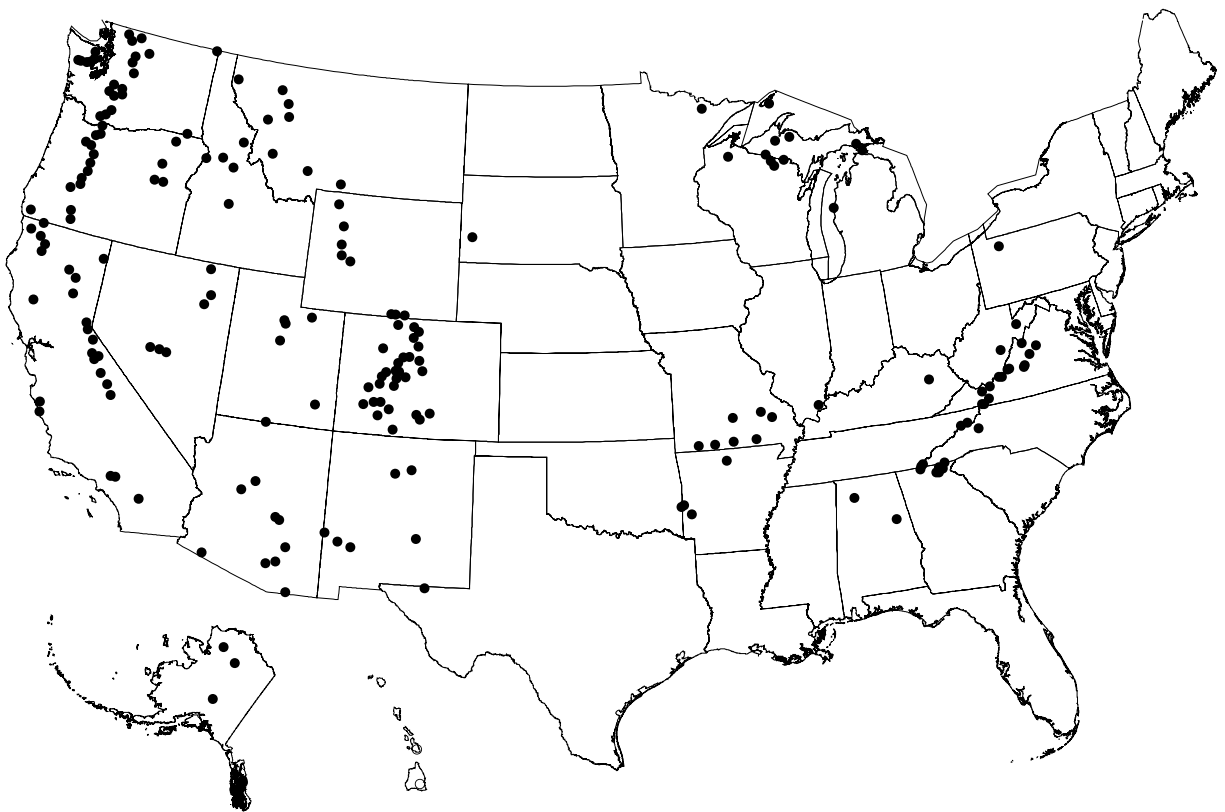


Figure 4b—Location of wildernesses with “good” baseline data on campsite conditions.



Figure 4c—Location of wildernesses with “good” baseline data on trail conditions.



Figure 4d—Location of wildernesses with “good” baseline data on their visitors.

are managed by the National Park Service and one is managed by the Bureau of Land Management; the other 63 are Forest Service wildernesses.

Conclusions

Clearly progress has been made in collecting baseline information regarding recreational visitors and their impacts on units of the NWPS. Progress in documenting the nature and extent of campsite impacts has been substantial, particularly in the last decade. Information on wilderness visitors continues to slowly accrue, while information on trail conditions remains sparse. However, almost one-half of the wildernesses in the NWPS had no baseline data of any type regarding recreational visitors and their impacts. Few wildernesses managed by the BLM and FWS had such data. The paucity of baseline recreation data indicates the high value that should be attached to whatever baseline data exist. These data represent all the information we will ever have regarding recreational conditions in the NWPS in the twentieth century. Every effort should be made to ensure that these data (and whatever documentation is necessary to facilitate their replication and interpretation) are archived in such a manner that they will be preserved in perpetuity. Finally, we hope that this report will (1) help managers of wildernesses without such data better meet their monitoring responsibilities, and (2) facilitate future studies that seek to replicate early studies in order to gain insight into trends across the NWPS.

References

- Cole, David N. 1983. Monitoring the condition of wilderness campsites. Res. Pap. INT-302. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 10 p.
- Cole, David N. 1989. Wilderness campsite monitoring methods: a sourcebook. Gen. Tech. Rep. INT-259. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 57 p.

- Cole, David N. 1996. Wilderness recreation use trends, 1965 through 1994. Res. Pap. INT-RP-488. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 10 p.
- Dale, Donn R. 1973. Effects of trail-use under forests in the Madison Range, Montana. Bozeman, MT: Montana State University. 96 p. Thesis.
- Frissell, Sidney S., Jr. 1963. Recreational use of campsites in the Quetico-Superior Canoe Country. St. Paul, MN: University of Minnesota. 66 p. Thesis.
- Frissell, Sidney S. 1978. Judging impacts on wilderness campsites. *Journal of Forestry*. 76: 481–483.
- Helgath, Sheila F. 1974. Selway-Bitterroot Wilderness trail deterioration study. Pullman: Washington State University. 103 p. Thesis.
- Leung, Yu-Fai.; Marion, Jeffrey L. 1999a. Characterizing backcountry camping impacts in Great Smoky Mountains National Park, USA. *Journal of Environmental Management*. 57: 193–203.
- Leung, Yu-Fai; Marion, Jeffrey L. 1999b. The influence of sampling interval on the accuracy of trail impact assessment. *Landscape and Urban Planning*. 43: 167–179.
- Leung, Yu-Fai; Marion, Jeffrey L. 2000 Recreation impact and management in wilderness: a state-of-knowledge review. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. *Wilderness science in a time of change conference*. Vol. 5. Wilderness ecosystems, threats and management; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-5. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 23–48.
- Lime, David W.; Fox, Karen M.; Jeong, Gang Hoan; Lewis, Michael S. 1990. Wildland recreation research in the western Lake Superior basin: an annotated bibliography. 1990. Misc. Pub. 66-1990. St. Paul: University of Minnesota, Minnesota Agricultural Experiment Station. 62 p.
- Taves, Marvin; Hathaway, William; Bultena, Gordon. 1960. Canoe country vacationers. Misc. Rep. 39. St. Paul: University of Minnesota, Agricultural Experiment Station. 28 p.
- Thornburgh, Dale A. 1962. An ecological study of the effect of man's recreational use at two subalpine sites in western Washington. Berkeley: University of California, Berkeley. 50 p. Thesis.
- Wildland Research Center, University of California. 1962. Wilderness and recreation—a report on resources, values and problems. Review Commission Study Report 3. Washington, DC: Outdoor Recreation Resources. 352 p.
- Worf, Bill. 2001. The new Forest Service wilderness recreation strategy spells doom for the National Wilderness Preservation System. *International Journal of Wilderness*. 7(1): 15–17.

Appendix A: Types of baseline data (campsite impact, trail impact, or visitor characteristics) available for each wilderness in the National Wilderness Preservation System.

Wilderness	Agency	State	Camp	Trail	Visitor
Absaroka-Beartooth	FS	MT/WY	Y	N	N
Agassiz	FWS	MN	N	N	N
Agua Tibia	FS	CA	N	N	N
Aldo Leopold	FS	NM	Y	N	N
Aleutian Islands	FWS	AK	N	N	N
Alexander Springs	FS	FL	N	N	N
Allegheny Islands	FS	PA	Y	N	N
Alpine Lakes	FS	WA	Y	Y	Y
Alta Toquima	FS	NV	Y	N	N
Anaconda Pintler	FS	MT	Y	N	Y
Andreafsky	FWS	AK	N	N	N
Ansel Adams	FS	CA	Y	Y	Y
Apache Creek	FS	AZ	Y	N	N
Apache Kid	FS	NM	N	N	N
Aravaipa Canyon	BLM	AZ	Y	N	Y
Arc Dome	FS	NV	Y	N	N
Argus Range	BLM	CA	N	N	N
Arrastra Mountain	BLM	AZ	N	N	N
Ashdown Gorge	FS	UT	Y	N	N
Aubrey Peak	BLM	AZ	N	N	N
Baboquivari Peak	BLM	AZ	N	N	N
Badger Creek	FS	OR	Y	N	N
Badlands	NPS	SD	N	N	N
Bald Knob	FS	IL	N	N	N
Bald River Gorge	FS	TN	Y	N	N
Bandelier	NPS	NM	Y	Y	N
Barbours Creek	FS	VA	Y	N	N
Bay Creek	FS	IL	N	N	Y
Bear Wallow	FS	AZ	N	N	N
Beartown	FS	VA	Y	N	N
Beaver Creek	FS	KY	N	N	N
Beaver Dam Mountains	BLM	AZ/UT	N	N	N
Becharof	FWS	AK	N	N	N
Bell Mountain	FS	MO	Y	N	Y
Bering Sea	FWS	AK	N	N	N
Big Branch	FS	VT	Y	N	N
Big Frog	FS	GA/TN	Y	N	Y
Big Gum Swamp	FS	FL	N	N	N
Big Horn Mountains	BLM	AZ	N	N	N
Big Island Lake	FS	MI	Y	N	N
Big Lake	FWS	AR	N	N	N
Big Laurel Branch	FS	TN	Y	N	N
Big Maria Mountains	BLM	CA	N	N	N
Big Slough	FS	TX	N	N	N
Bigelow Cholla Garden	BLM	CA	N	N	N
Bighorn Mountain	BLM / FS	CA	N	N	N
Billies Bay	FS	FL	N	N	N
Birkhead Mountains	FS	NC	N	N	N
Bisti / De-na-zin	BLM	NM	N	N	N
Black Canyon	FS	OR	N	N	N
Black Canyon of the Gunnison	NPS	CO	Y	N	N
Black Creek	FS	MS	N	N	N
Black Elk	FS	SD	Y	Y	Y
Black Fork Mountain	FS	AR/OK	Y	N	N
Black Mountain	BLM	CA	N	N	N

Appendix A (continued)

Wilderness	Agency	State	Camp	Trail	Visitor
Blackbeard Island	FWS	GA	N	N	N
Blackjack Springs	FS	WI	Y	N	Y
Blood Mountain	FS	GA	Y	N	Y
Blue Range	FS	NM	Y	Y	N
Bob Marshall	FS	MT	Y	N	Y
Bogoslof	FWS	AK	N	N	N
Bosque del Apache	FWS	NM	N	N	N
Boulder Creek	FS	OR	Y	N	Y
Boulder River	FS	WA	Y	N	N
Boundary Peak	FS	NV	N	N	N
Boundary Waters Canoe Area	FS	MN	Y	N	Y
Box-Death Hollow	FS	UT	N	Y	Y
Bradwell Bay	FS	FL	N	N	N
Brasstown	FS	GA	Y	N	N
Breadloaf	FS	VT	Y	N	Y
Breton	FWS	LA	N	N	N
Bridge Creek	FS	OR	N	N	N
Bridger	FS	WY	Y	N	Y
Brigantine	FWS	NJ	N	N	N
Bright Star	BLM	CA	N	N	N
Bristol Cliffs	FS	VT	N	N	N
Bristol Mountains	BLM	CA	N	N	N
Buckhorn	FS	WA	Y	N	N
Bucks Lake	FS	CA	Y	N	N
Buffalo National River	NPS	AR	Y	N	Y
Buffalo Peaks	FS	CO	Y	N	N
Bull of the Woods	FS	OR	Y	N	N
Burden Falls	FS	IL	N	N	Y
Byers Peak	FS	CO	Y	N	N
Cabeza Prieta	FWS	AZ	Y	Y	N
Cabinet Mountains	FS	MT	Y	N	Y
Cache La Poudre	FS	CO	Y	N	N
Cadiz Dunes	BLM	CA	N	N	N
Caney Creek	FS	AR	Y	N	Y
Cape Romain	FWS	SC	N	N	N
Capitan Mountains	FS	NM	Y	N	N
Caribou	FS	CA	Y	N	N
Caribou-Speckled Mountain	FS	ME	N	N	Y
Carlsbad Caverns	NPS	NM	N	N	N
Carrizo Gorge	BLM	CA	N	N	N
Carson-Iceberg	FS	CA	Y	N	N
Castle Crags	FS	CA	N	N	Y
Castle Creek	FS	AZ	Y	N	N
Catfish Lake South	FS	NC	N	N	N
Cebolla	BLM	NM	Y	N	N
Cedar Bench	FS	AZ	N	N	N
Cedar Keys	FWS	FL	N	N	N
Chama River Canyon	FS	NM	N	N	N
Chamisso	FWS	AK	N	N	N
Chanchelulla	FS	CA	N	N	N
Charles C. Deam	FS	IN	Y	Y	Y
Chase Lake	FWS	ND	N	N	N
Chassahowitzka	FWS	FL	N	N	N
Cheaha	FS	AL	Y	N	Y
Chemehuevi Mountains	BLM	CA	N	N	N
Chimney Peak	BLM	CA	N	N	N
Chiricahua	FS	AZ	Y	N	N
Chiricahua National Monument	NPS	AZ	N	N	N

Appendix A (continued)

Wilderness	Agency	State	Camp	Trail	Visitor
Chuck River	FS	AK	Y	N	N
Chuckwalla Mountains	BLM	CA	N	N	N
Chumash	FS	CA	Y	N	N
Citico Creek	FS	TN	N	N	N
Clear Springs	FS	IL	N	N	N
Clearwater	FS	WA	Y	N	Y
Cleghorn Lakes	BLM	CA	N	N	N
Clifty	FS	KY	Y	Y	N
Clipper Mountain	BLM	CA	N	N	N
Cloud Peak	FS	WY	Y	N	N
Cohutta	FS	GA/TN	Y	Y	Y
Collegiate Peaks	FS	CO	Y	N	Y
Colonel Bob	FS	WA	Y	Y	N
Comanche Peak	FS	CO	Y	N	Y
Congaree Swamp					
National Monument	NPS	SC	N	N	N
Coronation Island	FS	AK	Y	N	N
Coso Range	BLM	CA	N	N	N
Cottonwood Point	BLM	AZ	N	N	N
Coyote Mountains	BLM	AZ/CA	N	N	N
Crab Orchard	FWS	IL	N	N	N
Cranberry	FS	WV	Y	Y	Y
Craters of the Moon					
National Monument	NPS	ID	Y	N	N
Cruces Basin	FS	NM	N	N	N
Cucamonga	FS	CA	Y	N	Y
Cumberland Island	NPS	GA	N	N	Y
Cummins Creek	FS	OR	N	N	N
Currant Mountain	FS	NV	N	N	N
Dark Canyon	FS	UT	Y	N	Y
Darwin Falls	BLM	CA	N	N	N
Dead Mountains	BLM	CA	N	N	N
Death Valley	NPS	CA/NV	N	N	Y
Delirium	FS	MI	N	N	N
Denali	NPS	AK	Y	Y	Y
Deseret Peak	FS	UT	N	N	N
Desolation	FS	CA	Y	N	Y
Devils Backbone	FS	MO	Y	N	Y
Diamond Peak	FS	OR	Y	N	N
Dick Smith	FS	CA	Y	N	N
Dinkey Lakes	FS	CA	Y	N	N
Dolly Sods	FS	WV	Y	Y	Y
Dome	FS	NM	Y	N	N
Domeland	FS / BLM	CA	Y	Y	N
Dos Cabezas Mountains	BLM	AZ	N	N	N
Drift Creek	FS	OR	N	N	N
Dry Creek	FS	AR	N	N	N
Dugger Mountain	FS	AL	N	N	N
Eagle Cap	FS	OR	Y	N	Y
Eagles Nest	FS	CO	Y	N	Y
Eagletail Mountains	BLM	AZ	N	N	N
East Cactus Plain	BLM	AZ	N	N	N
East Fork	FS	AR	N	N	N
East Humboldts	FS	NV	Y	N	N
El Paso Mountains	BLM	CA	N	N	N
Ellicott Rock	FS	GA/NC/SC	Y	N	Y
Emigrant	FS	CA	Y	N	N
Encampment River	FS	WY	Y	N	N

Appendix A (continued)

Wilderness	Agency	State	Camp	Trail	Visitor
Endicott River	FS	AK	N	N	N
Escudilla	FS	AZ	N	N	N
Farallon	FWS	CA	N	N	N
Fire Island	NPS	NY	N	N	N
Fish Creek Mountains	BLM	CA	N	N	N
Fishhooks	BLM	AZ	N	N	N
Fitzpatrick	FS	WY	Y	Y	Y
Flat Tops	FS	CO	Y	N	Y
Flatside	FS	AR	Y	N	N
Florida Keys	FWS	FL	N	N	N
Forrester Island	FWS	AK	N	N	N
Fort Niobrara	FWS	NE	N	N	Y
Fossil Ridge	FS	CO	Y	N	N
Fossil Springs	FS	AZ	Y	N	N
Four Peaks	FS	AZ	Y	N	N
Frank Church-River of No Return	FS / BLM	ID	Y	N	Y
Funeral Mountains	BLM	CA	N	N	N
Galiuro	FS	AZ	N	N	N
Garcia	FS	CA	Y	N	N
Garden of the Gods	FS	IL	Y	N	Y
Gates of the Arctic	NPS	AK	Y	N	N
Gates of the Mountains	FS	MT	Y	N	N
Gearhart Mountain	FS	OR	Y	N	N
Gee Creek	FS	TN	Y	N	N
George D. Aiken	FS	VT	N	N	N
Gibraltar Mountain	BLM	AZ	N	N	N
Gila	FS	NM	Y	Y	Y
Glacier Bay	NPS	AK	N	N	Y
Glacier Peak	FS	WA	Y	N	Y
Glacier View	FS	WA	Y	N	N
Goat Rocks	FS	WA	Y	N	N
Golden Trout	FS	CA	Y	Y	N
Golden Valley	BLM	CA	N	N	N
Gospel-Hump	FS	ID	Y	N	N
Grand Wash Cliffs	BLM	AZ	N	N	N
Granite Chief	FS	CA	Y	N	N
Granite Mountain	FS	AZ	Y	N	Y
Grant Range	FS	NV	N	N	N
Grass Valley	BLM	CA	N	N	N
Grassy Knob	FS	OR	N	N	N
Great Bear	FS	MT	Y	N	Y
Great Gulf	FS	NH	Y	N	Y
Great Sand Dunes	NPS	CO	Y	N	Y
Great Swamp National Wildlife Refuge	FWS	NJ	N	N	N
Greenhorn Mountain	FS	CO	Y	N	N
Gros Ventre	FS	WY	Y	Y	N
Guadalupe Mountains	NPS	TX	Y	Y	N
Gulf Islands	NPS	MS	N	N	N
Gunnison Gorge	BLM	CO	N	N	N
Haleakala	NPS	HI	N	N	Y
Harcuvar Mountains	BLM	AZ	N	N	N
Harquahala Mountains	BLM	AZ	N	N	N
Hassayampa River Canyon	BLM	AZ	N	N	N
Hauser	FS	CA	N	N	N
Havas	FWS	AZ/CA	N	N	N

Appendix A (continued)

Wilderness	Agency	State	Camp	Trail	Visitor
Hawaii Volcanoes	NPS	HI	Y	N	Y
Hazy Islands	FWS	AK	N	N	N
Headwaters	FS	WI	Y	N	Y
Hell Hole Bay	FS	SC	N	N	N
Hells Canyon	BLM	AZ	N	N	N
Hells Canyon	FS / BLM	ID/OR	Y	N	Y
Hellsgate	FS	AZ	N	N	N
Henry M. Jackson	FS	WA	Y	N	Y
Hercules-Glades	FS	MO	Y	N	Y
Hickory Creek	FS	PA	Y	N	Y
High Uintas	FS	UT	Y	N	Y
Hollow Hills	BLM	CA	N	N	N
Holy Cross	FS	CO	Y	N	Y
Hoover	FS	CA	Y	N	N
Horseshoe Bay	FS	MI	N	N	N
Hummingbird Springs	BLM	AZ	N	N	N
Hunter-Fryingpan	FS	CO	Y	N	Y
Huron Islands	FWS	MI	N	N	N
Hurricane Creek	FS	AR	Y	N	N
Huston Park	FS	WY	Y	N	N
Ibex	BLM	CA	N	N	N
Imperial Refuge	FWS	AZ/CA	N	N	N
Indian Heaven	FS	WA	Y	N	N
Indian Mounds	FS	TX	N	N	N
Indian Pass	BLM	CA	N	N	N
Indian Peaks	FS / NPS	CO	Y	Y	Y
Innoko	FWS	AK	N	N	N
Inyo Mountains	BLM / FS	CA	N	N	N
Irish	FS	MO	Y	N	Y
Ishi	FS / BLM	CA	Y	N	N
Island Bay	FWS	FL	N	N	N
Isle Royale	NPS	MI	Y	N	Y
Izembek	FWS	AK	N	N	N
J.N. "Ding" Darling	FWS	FL	N	N	N
Jacumba	BLM	CA	N	N	N
James River Face	FS	VA	Y	N	N
Jarbridge	FS	NV	Y	N	N
Jedediah Smith	FS	WY	Y	N	Y
Jennie Lakes	FS	CA	N	N	N
John Muir	FS	CA	Y	Y	Y
Joshua Tree	NPS	CA	N	N	Y
Joyce Kilmer-Slickrock	FS	NC / TN	Y	N	Y
Juniper Dunes	BLM	WA	N	N	N
Juniper Mesa	FS	AZ	Y	N	N
Juniper Prairie	FS	FL	N	N	Y
Kachina Peaks	FS	AZ	Y	N	N
Kaiser	FS	CA	Y	N	N
Kalmiopsis	FS	OR	Y	N	N
Kanab Creek	FS / BLM	AZ	Y	N	N
Karta River	FS	AK	Y	N	N
Katmai	NPS	AK	N	N	Y
Kelso Dunes	BLM	CA	N	N	N
Kenai	FWS	AK	N	N	Y
Kendrick Mountain	FS	AZ	Y	N	N
Kiavah	FS / BLM	CA	Y	Y	N
Kimberling Creek	FS	VA	Y	N	N
Kingston Range	BLM	CA	N	N	N
Kisatchie Hills	FS	LA	N	N	N

Appendix A (continued)

Wilderness	Agency	State	Camp	Trail	Visitor
Kobuk Valley	NPS	AK	N	N	N
Kofa	FWS	AZ	N	N	N
Kootznooowoo	FS	AK	Y	N	N
Koyukuk	FWS	AK	N	N	N
Kuiu	FS	AK	Y	Y	N
La Garita	FS	CO	Y	N	N
Lacassine	FWS	LA	N	N	N
Lake Chelan-Sawtooth	FS	WA	Y	N	N
Lake Clark	NPS	AK	Y	N	N
Lake Woodruff	FWS	FL	N	N	N
Lassen Volcanic	NPS	CA	Y	N	Y
Latir Peak	FS	NM	N	N	N
Laurel Fork North	FS	WV	N	N	N
Laurel Fork South	FS	WV	N	N	N
Lava Beds	NPS	CA	N	N	N
Leaf	FS	MS	N	N	N
Leatherwood	FS	AR	N	N	N
Lee Metcalf	FS / BLM	MT	Y	Y	Y
Lewis Fork	FS	VA	Y	Y	Y
Linville Gorge	FS	NC	Y	Y	Y
Little Chuckwalla Mountains	BLM	CA	N	N	N
Little Dry Run	FS	VA	Y	Y	Y
Little Frog Mountain	FS	TN	Y	N	N
Little Lake Creek	FS	TX	N	N	Y
Little Lake George	FS	FL	N	N	N
Little Picacho	BLM	CA	N	N	N
Little Wambaw Swamp	FS	SC	N	N	N
Little Wilson Creek	FS	VA	Y	Y	Y
Lizard Head	FS	CO	N	N	N
Lone Peak	FS	UT	Y	N	Y
Lost Creek	FS	CO	Y	N	N
Lostwood	FWS	ND	N	N	N
Lusk Creek	FS	IL	N	N	Y
Lye Brook	FS	VT	Y	N	N
Machesna Mountain	FS / BLM	CA	Y	N	N
Mackinac	FS	MI	Y	N	N
Malpais Mesa	BLM	CA	N	N	N
Manly Peak	BLM	CA	N	N	N
Manzano Mountain	FS	NM	N	Y	N
Marble Mountain	FS	CA	Y	N	N
Marjory Stoneman Douglas	NPS	FL	N	N	Y
Mark O. Hatfield	FS	OR	Y	N	N
Mark Trail	FS	GA	Y	N	N
Maroon Bells-Snowmass	FS	CO	Y	N	Y
Matilija	FS	CA	Y	N	N
Maurille Islands	FS	AK	Y	N	N
Mazatzal	FS	AZ	Y	N	N
McCormick	FS	MI	Y	N	N
Mecca Hills	BLM	CA	N	N	Y
Medicine Lake	FWS	MT	N	N	N
Menagerie	FS	OR	Y	N	N
Mesa Verde	NPS	CO	N	N	N
Mesquite	BLM	CA	N	N	N
Michigan Islands	FWS	MI	N	N	N
Middle Prong	FS	NC	Y	N	N
Middle Santiam	FS	OR	Y	N	N
Mill Creek	FS	OR	Y	Y	N
Miller Peak	FS	AZ	Y	N	N

Appendix A (continued)

Wilderness	Agency	State	Camp	Trail	Visitor
Mingo	FWS	MO	N	N	N
Mission Mountains	FS	MT	Y	N	Y
Misty Fjords National Monument	FS	AK	Y	N	N
Mojave	NPS	CA	N	N	N
Mokelumne	FS	CA	Y	N	N
Mollie Beattie	FWS	AK	Y	N	Y
Monarch	FS	CA	Y	N	N
Monomoy	FWS	MA	N	N	N
Monument Rock	FS	OR	Y	N	N
Moosehorn	FWS	ME	N	N	N
Moosehorn (Baring Unit)	FWS	ME	N	N	N
Mount Adams	FS	WA	Y	N	N
Mount Baker	FS	WA	Y	N	Y
Mount Baldy	FS	AZ	Y	N	Y
Mount Evans	FS	CO	Y	N	N
Mount Hood	FS	OR	Y	N	N
Mount Jefferson	FS	OR	Y	Y	Y
Mount Logan	BLM	AZ	N	N	N
Mount Massive	FS / FWS	CO	Y	N	N
Mount Naomi	FS	UT	Y	N	Y
Mount Nebo	FS	UT	Y	N	N
Mount Nutt	BLM	AZ	N	N	N
Mount Olympus	FS	UT	N	N	Y
Mount Rainier	NPS	WA	Y	Y	Y
Mount Skokomish	FS	WA	Y	N	N
Mount Sneffels	FS	CO	Y	N	N
Mount Thielsen	FS	OR	Y	N	N
Mount Timpanogos	FS	UT	Y	Y	Y
Mount Tipton	BLM	AZ	N	N	N
Mount Trumbull	BLM	AZ	N	N	N
Mount Washington	FS	OR	Y	N	Y
Mount Wilson	BLM	AZ	N	N	N
Mount Zirkel	FS	CO	Y	N	N
Mountain Lake	FS	VA/WV	Y	N	N
Mountain Lakes	FS	OR	Y	Y	Y
Mt. Charleston	FS	NV	N	N	N
Mt. Moriah	FS / BLM	NV	N	N	N
Mt. Rose	FS	NV	Y	N	N
Mt. Shasta	FS	CA	Y	N	Y
Mt. Wrightson	FS	AZ	N	N	N
Mud Swamp/New River	FS	FL	N	N	N
Muggins Mountain	BLM	AZ	Y	N	N
Munds Mountain	FS	AZ	Y	N	Y
Needle's Eye	BLM	AZ	N	N	N
Neota	FS	CO	Y	N	N
Never Summer	FS	CO	Y	Y	N
New Water Mountains	BLM	AZ	N	N	N
Newberry Mountains	BLM	CA	N	N	N
Noatak	NPS	AK	Y	N	N
Noisy-Diobsud	FS	WA	Y	N	Y
Nopah Range	BLM	CA	N	N	N
Nordhouse Dunes	FS	MI	Y	N	Y
Norse Peak	FS	WA	Y	N	Y
North Absaroka	FS	WY	Y	Y	N
North Algodones Dunes	BLM	CA	N	N	N
North Fork	FS	CA	N	N	N
North Fork John Day	FS	OR	Y	N	N

Appendix A (continued)

Wilderness	Agency	State	Camp	Trail	Visitor
North Fork Umatilla	FS	OR	Y	N	N
North Maricopa Mountains	BLM	AZ	N	N	N
North Mesquite Mountains	BLM	CA	N	N	N
North Santa Teresa	BLM	AZ	N	N	N
Nunivak	FWS	AK	N	N	N
Okefenokee	FWS	GA	N	N	Y
Old Woman Mountains	BLM	CA	N	N	N
Olympic	NPS	WA	Y	Y	Y
Opal Creek	FS	OR	N	N	N
Oregon Islands	FWS	OR	N	N	N
Organ Pipe Cactus	NPS	AZ	N	N	N
Orocopia Mountains	BLM	CA	N	N	N
Otay Mountain	BLM	CA	N	N	N
Otter Creek	FS	WV	Y	N	Y
Owens Peak	BLM	CA	N	N	N
Paddy Creek	FS	MO	Y	N	Y
Pahrump Valley	BLM	CA	N	N	N
Paiute	BLM	AZ	N	N	N
Pajarita	FS	AZ	N	N	N
Palen/McCoy	BLM	CA	N	N	N
Palo Verde Mountains	BLM	CA	N	N	N
Panther Den	FS	IL	N	N	Y
Paria Canyon-Vermilion Cliffs	BLM	AZ/UT	Y	N	Y
Pasayten	FS	WA	Y	N	N
Passage Key	FWS	FL	N	N	N
Pecos	FS	NM	Y	N	Y
Pelican Island	FWS	FL	N	N	N
Peloncillo Mountains	BLM	AZ	N	N	N
Pemigewasset	FS	NH	Y	N	Y
Peru Peak	FS	VT	Y	N	N
Peters Mountain	FS	VA	Y	N	N
Petersburg Creek-Duncan Salt Chuck	FS	AK	Y	Y	N
Petrified National Forest	NPS	AZ	N	N	N
Phillip Burton	NPS	CA	N	N	N
Picacho Peak	BLM	CA	N	N	N
Pine Creek	FS	CA	N	N	N
Pine Mountain	FS	AZ	N	N	N
Pine Valley Mountain	FS	UT	Y	N	Y
Piney Creek	FS	MO	Y	N	Y
Pinnacles	NPS	CA	N	N	N
Piper Mountain	BLM	CA	N	N	N
Piute Mountains	BLM	CA	N	N	N
Platte River	FS	CO/WY	Y	N	N
Pleasant/Lemusurier/ Inian Islands	FS	AK	N	N	N
Pocosin	FS	NC	N	N	N
Pond Mountain	FS	TN	Y	N	N
Pond Pine	FS	NC	N	N	N
Popo Agie	FS	WY	Y	N	Y
Porcupine Lake	FS	WI	Y	N	Y
Poteau Mountain	FS	AR	N	N	N
Powderhorn	BLM / FS	CO	Y	N	N
Presidential Range-Dry River	FS	NH	N	N	N
Ptarmigan Peak	FS	CO	Y	N	N
Pusch Ridge	FS	AZ	Y	N	N
Quinn Canyon	FS	NV	N	N	N
Raggeds	FS	CO	Y	N	Y

Appendix A (continued)

Wilderness	Agency	State	Camp	Trail	Visitor
Rainbow Lake	FS	WI	Y	N	N
Ramseys Draft	FS	VA	Y	N	Y
Rattlesnake	FS	MT	Y	Y	Y
Raven Cliffs	FS	GA	Y	Y	N
Rawah	FS	CO	Y	N	Y
Rawhide Mountains	BLM	AZ	N	N	N
Red Buttes	FS	CA/OR	Y	N	Y
Red Rock Lakes	FWS	MT	N	N	N
Red Rock-Secret Mountain	FS	AZ	Y	N	Y
Redfield Canyon	BLM	AZ	N	N	N
Resting Spring Range	BLM	CA	N	N	N
Rice Valley	BLM	CA	N	N	N
Rich Hole	FS	VA	N	N	N
Rich Mountain	FS	GA	N	N	N
Richland Creek	FS	AR	Y	N	N
Rincon Mountain	FS	AZ	N	N	N
Riverside Mountains	BLM	CA	N	N	N
Rock Creek	FS	OR	N	N	N
Rock River Canyon	FS	MI	Y	N	N
Rockpile Mountain	FS	MO	Y	N	Y
Rodman Mountains	BLM	CA	N	N	N
Rogue-Umpqua Divide	FS	OR	Y	N	Y
Rough Mountain	FS	VA	N	N	N
Round Island	FS	MI	Y	N	N
Ruby Mountains	FS	NV	Y	N	N
Russell Fjord	FS	AK	Y	N	N
Russian	FS	CA	Y	N	N
Sacatar Trail	BLM	CA	N	N	N
Saddle Mountain	FS	AZ	N	N	N
Saddle Peak Hills	BLM	CA	N	N	N
Saguaro	NPS	AZ	Y	N	Y
Saint Lazaria	FWS	AK	N	N	N
Saint Mary's	FS	VA	Y	N	Y
Salmon-Huckleberry	FS	OR	Y	N	N
Salmo-Priest	FS	ID	Y	N	N
Salome	FS	AZ	Y	N	N
Salt Creek	FWS	NM	N	N	N
Salt River Canyon	FS	AZ	Y	N	N
Sampson Mountain	FS	TN	Y	N	N
San Gabriel	FS	CA	Y	N	Y
San Geronio	FS / BLM	CA	N	N	Y
San Jacinto	FS	CA	Y	N	Y
San Juan	FWS	WA	N	N	N
San Mateo Canyon	FS	CA	N	N	Y
San Pedro Parks	FS	NM	N	N	N
San Rafael	FS	CA	Y	N	N
Sandia Mountain	FS	NM	N	N	Y
Sandwich Range	FS	NH	N	N	Y
Sangre de Cristo	FS	CO	Y	Y	Y
Santa Lucia	FS / BLM	CA	Y	N	N
Santa Rosa	BLM / FS	CA	Y	N	N
Santa Rosa-Paradise Peak	FS	NV	N	N	N
Santa Teresa	FS	AZ	N	N	N
Sarvis Creek	FS	CO	Y	N	N
Savage Run	FS	WY	N	N	N
Sawtooth	FS	ID	Y	N	Y
Sawtooth Mountains	BLM	CA	N	N	N
Scapegoat	FS	MT	Y	N	Y

Appendix A (continued)

Wilderness	Agency	State	Camp	Trail	Visitor
Selawik	FWS	AK	N	N	N
Selway-Bitterroot	FS	ID/MT	Y	Y	Y
Semidi	FWS	AK	N	N	N
Seney	FWS	MI	N	N	N
Sequoia-Kings Canyon	NPS	CA	Y	N	Y
Sespe	FS	CA	Y	N	N
Shawvers Run	FS	VA	Y	N	N
Sheep Mountain	FS	CA	Y	N	Y
Sheep Ridge	FS	NC	N	N	N
Sheephole Valley	BLM	CA	N	N	N
Sherandoah	NPS	VA	Y	Y	Y
Shining Rock	FS	NC	Y	N	Y
Sierra Ancha	FS	AZ	Y	N	N
Sierra Estrella	BLM	AZ	N	N	N
Signal Mountain	BLM	AZ	N	N	N
Silver Peak	FS	CA	Y	N	N
Simeonof	FWS	AK	N	N	N
Sipsey	FS	AL	Y	N	Y
Siskiyou	FS	CA	Y	N	N
Sky Lakes	FS	OR	Y	Y	N
Snow Mountain	FS	CA	Y	N	N
Soldier Creek	FS	NE	N	N	N
South Baranof	FS	AK	Y	N	N
South Etolin	FS	AK	Y	N	N
South Maricopa Mountains	BLM	AZ	N	N	N
South Nopah Range	BLM	CA	N	N	N
South Prince of Wales	FS	AK	N	N	N
South San Juan	FS	CO	Y	N	N
South Sierra	FS	CA	Y	Y	N
South Warner	FS	CA	Y	N	N
Southern Nantahala	FS	GA/NC	Y	N	N
St. Marks	FWS	FL	N	N	N
Stateline	BLM	CA	N	N	N
Stephen Mather	NPS	WA	Y	Y	N
Stepladder Mountains	BLM	CA	N	N	N
Stikine-LeConte	FS	AK	Y	N	N
Strawberry Crater	FS	AZ	N	N	N
Strawberry Mountain	FS	OR	Y	N	N
Sturgeon River Gorge	FS	MI	Y	N	N
Superstition	FS	AZ	Y	Y	Y
Surprise Canyon	BLM	CA	N	N	N
Swanquarter	FWS	NC	N	N	N
Swansea	BLM	AZ	N	N	N
Sycamore Canyon	FS	AZ	Y	N	N
Sylvania	FS	MI	Y	N	N
Sylvania Mountains	BLM	CA	N	N	N
Table Mountain	FS	NV	Y	N	N
Table Rock	BLM	OR	Y	Y	N
Table Top	BLM	AZ	N	N	N
Tamarac	FWS	MN	N	N	N
Tatoosh	FS	WA	Y	N	N
Tebenkof Bay	FS	AK	Y	Y	N
Teton	FS	WY	Y	Y	Y
The Brothers	FS	WA	Y	N	N
Theodore Roosevelt	NPS	ND	N	N	N
Thousand Lakes	FS	CA	Y	N	N
Three Arch Rocks	FWS	OR	N	N	N
Three Sisters	FS	OR	Y	Y	Y

Appendix A (continued)

Wilderness	Agency	State	Camp	Trail	Visitor
Thunder Ridge	FS	VA	Y	N	N
Togiak	FWS	AK	Y	N	N
Tracy Arm-Fords Terror	FS	AK	Y	N	N
Trapper Creek	FS	WA	Y	N	N
Tray Mountain	FS	GA	Y	Y	N
Tres Alamos	BLM	AZ	N	N	N
Trigo Mountain	BLM	AZ	N	N	N
Trilobite	BLM	CA	N	N	N
Trinity Alps	FS / BLM	CA	Y	N	N
Turkey Hill	FS	TX	N	N	N
Turtle Mountains	BLM	CA	N	N	N
Tuxedni	FWS	AK	N	N	N
Twin Peaks	FS	UT	N	N	Y
UL Bend	FWS	MT	N	N	N
Unaka Mountain	FS	TN	Y	N	N
Uncompahgre	FS / BLM	CO	Y	N	Y
Unimak	FWS	AK	N	N	N
Upland Island	FS	TX	N	N	Y
Upper Buffalo	FS	AR	Y	N	N
Upper Burro Creek	BLM	AZ	N	N	N
Upper Kiamichi River	FS	OK	Y	Y	Y
Vasquez Peak	FS	CO	N	N	N
Ventana	FS	CA	Y	N	N
Wabayuma Peak	BLM	AZ	N	N	N
Waldo Lake	FS	OR	Y	N	N
Wambaw Creek	FS	SC	N	N	N
Wambaw Swamp	FS	SC	N	N	N
Warm Springs	BLM	AZ	N	N	N
Warren Island	FS	AK	Y	N	N
Washakie	FS	WY	Y	Y	N
Washington Islands	FWS	WA	N	N	N
Welcome Creek	FS	MT	N	N	N
Wellsville Mountain	FS	UT	Y	N	N
Weminuche	FS	CO	Y	N	Y
Wenaha-Tucannon	FS	OR/WA	Y	N	N
West Chichagof-Yakobi	FS	AK	Y	N	N
West Clear Creek	FS	AZ	Y	N	N
West Elk	FS	CO	Y	N	Y
West Malpais	BLM	NM	Y	N	N
West Sister Island	FWS	OH	N	N	N
Wet Beaver	FS	AZ	Y	N	N
Wheeler Peak	FS	NM	N	N	N
Whipple Mountains	BLM	CA	N	N	N
Whisker Lake	FS	WI	Y	N	Y
White Canyon	BLM	AZ	N	N	N
White Mountain	FS	NM	Y	N	N
Wichita Mountains	FWS	OK	N	N	N
Wild Rogue	FS / BLM	OR	Y	N	N
William O. Douglas	FS	WA	Y	N	N
Winegar Hole	FS	WY	N	N	N
Wisconsin Islands	FWS	WI	N	N	N
Withington	FS	NM	N	N	N
Wolf Island	FWS	GA	N	N	N
Wonder Mountain	FS	WA	Y	N	N
Woodchute	FS	AZ	N	N	N
Woolsey Peak	BLM	AZ	N	N	N
Wrangell-St. Elias	NPS	AK	Y	N	N
Yolla Bolly-Middle Eel	FS / BLM	CA	Y	N	N
Yosemite	NPS	CA	Y	Y	Y

Appendix B: Earliest date, sample type, and data characteristics of baseline campsite impact data available for each wilderness with campsite data. If no citation is given, data are unpublished. Characteristics of all unpublished data for each wilderness have been combined in a single row. If the row following the wilderness name is blank, there is no unpublished data. See text for definitions of sample type and data characteristics.

Wilderness	Earliest date	All/entire	All/portion	Sample/entire	Sample/portion	Opportunistic	Locations	Photopoints	Condition Class	Categorical	Quick measures	Detailed measures	GIS
Absaroka-Beartooth	1994	Y	N	N	N	N	Y	N	Y	Y	Y	Y	Y
Aldo Leopold	1995	Y	N	N	N	N	Y	Y	Y	N	Y	N	N
Allegheny Islands	1980	Y	N	N	N	N	Y	N	N	N	N	N	N
Alpine Lakes	1970	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
Cole and others (1997)	1991	N	Y	N	N	N	Y	N	Y	Y	Y	N	N
Alta Toquima	1993	Y	N	N	N	N	Y	N	Y	Y	N	N	N
Anaconda Pintler	1977	Y	N	Y	N	N	Y	Y	Y	Y	Y	Y	Y
Ansel Adams	1981	Y	Y	Y	N	N	Y	N	Y	Y	Y	N	Y
Apache Creek	1998	Y	N	N	N	N	Y	N	N	N	N	N	N
Aravaipa Canyon	1997	Y	N	N	N	N	Y	N	N	Y	Y	N	N
Arc Dome	1993	Y	N	N	N	N	Y	N	Y	Y	N	N	N
Ashdown Gorge	1997	Y	N	N	N	N	Y	N	N	N	N	N	N
Badger Creek	1996	N	N	N	N	Y	Y	N	N	N	N	N	N
Bald River Gorge	1987	N	N	Y	N	N	Y	Y	N	Y	N	N	N
Bandelier	1993	Y	N	N	N	N	Y	Y	Y	Y	N	Y	N
Barbours Creek	1990	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Leung and Marion (2000)	Unknown	Y	N	N	N	N	Y	N	Y	Y	Y	Y	N
Beartown	1990	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Leung and Marion (2000)	Unknown	Y	N	N	N	N	Y	N	Y	Y	Y	Y	N
Bell Mountain	1993	Y	N	N	N	N	Y	Y	N	Y	Y	N	N
Big Branch	1995	N	N	N	Y	N	Y	N	Y	N	N	N	N
Big Frog	1995	Y	N	N	N	N	Y	Y	N	Y	Y	N	N
Big Island Lake	1997	Y	N	N	N	N	Y	Y	N	N	N	N	N
Big Laurel Branch	1992	N	N	N	Y	N	Y	Y	N	Y	Y	N	N
Black Canyon of the Gunnison	1996	Y	N	N	N	N	Y	Y	N	Y	N	Y	N
Black Elk	1996	Y	N	N	N	N	Y	N	Y	Y	N	Y	N
Black Fork Mountain	Unknown	Y	N	N	N	N	Y	N	N	N	Y	N	N
Blackjack Springs	1992	Y	N	N	N	N	Y	N	Y	Y	Y	N	N
Blood Mountain	1995	Y	N	N	N	N	Y	Y	Y	Y	N	Y	N
Blue Range	1994	Y	N	N	N	N	Y	N	Y	N	N	N	N
Bob Marshall	1984	Y	N	Y	N	N	Y	N	Y	Y	Y	N	Y
Cole and Hall (1992)	1981	N	N	N	Y	N	Y	N	N	N	N	Y	N
Weesner (1990)	1981	N	Y	N	N	N	Y	N	Y	Y	Y	Y	N
Cole (1982b)	1981	N	Y	N	N	N	Y	Y	N	Y	Y	N	N
Cole (1983a)	1982	N	N	Y	N	N	Y	N	N	Y	Y	Y	N
Cole (1984)	1983	N	N	Y	N	N	Y	Y	N	Y	Y	N	N
Boulder Creek	1970	Y	N	N	N	N	Y	N	N	Y	N	N	Y
Boulder River	1997	N	N	Y	N	N	Y	N	N	N	N	N	N
Boundary Waters Canoe Area	1986	N	Y	N	N	N	Y	N	N	Y	Y	N	N
Frissell (1963)	1962	N	N	N	Y	N	Y	N	N	N	N	Y	N
Frissell and Duncan (1965)	1962	N	N	N	Y	N	Y	N	N	Y	N	Y	N
McCool and others (1969)	1966	N	N	Y	N	N	Y	N	N	Y	N	Y	N
Merriam and others (1973)	1968	N	N	N	Y	N	Y	Y	Y	N	N	Y	N
Merriam and Peterson (1983)	1968	N	N	N	Y	N	Y	N	Y	N	N	Y	N
Merriam and Smith (1974)	1968	N	N	N	Y	N	Y	Y	Y	N	N	Y	N
Merriam and Smith (1975)	1974	N	N	N	Y	N	Y	Y	Y	N	N	Y	N
Cole and Marion (1986)	1983	N	N	Y	N	N	Y	N	N	Y	N	Y	N
Marion (1984)	1983	N	N	Y	N	N	Y	N	Y	Y	N	Y	N
Marion and Merriam (1985a,b)	1983	N	N	Y	N	N	Y	N	Y	Y	N	Y	N

Appendix B (continued)

Wilderness	Earliest date	All/entire	All/portion	Sample/entire	Sample/portion	Opportunistic	Locations	Photopoints	Condition Class	Categorical	Quick measures	Detailed measures	GIS
Brasstown	1995	Y	N	N	N	N	Y	Y	Y	Y	N	Y	N
Breadloaf	1992	N	N	N	Y	N	Y	N	N	N	Y	N	N
Bridger	1989	Y	N	N	N	N	Y	N	Y	Y	Y	N	N
Dunwiddie and Heberlein (1976)	1974	N	Y	N	N	N	Y	N	N	Y	N	N	N
Buckhorn	1970	Y	N	Y	N	N	Y	N	Y	Y	N	N	N
Bucks Lake	1987	Y	N	N	N	N	Y	Y	Y	Y	Y	N	N
Buffalo National River	1991	Y	N	N	N	N	Y	N	Y	Y	Y	Y	Y
Buffalo Peaks	1980	Y	N	N	Y	Y	Y	N	N	Y	N	N	N
Bull of the Woods	1998	Y	N	N	N	N	Y	N	N	N	Y	N	N
Byers Peak	1999	N	Y	N	N	N	Y	Y	Y	N	N	N	N
Cabeza Prieta	1998	Y	N	N	N	N	Y	Y	N	Y	Y	N	N
Cabinet Mountains	1983	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	N
Cache La Poudre	1989	Y	N	N	N	N	Y	N	N	N	N	N	N
Caney Creek	1977	Y	N	N	N	N	Y	N	N	N	N	N	N
McEwen and others (1996)	1994	Y	N	N	N	N	Y	N	Y	Y	Y	N	N
Capitan Mountains	1997	N	N	Y	N	N	Y	N	N	Y	Y	N	N
Caribou	1990	Y	N	N	N	N	Y	Y	Y	Y	Y	N	N
Carson-Iceberg	1980	N	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y
Castle Creek	1998	Y	N	N	N	N	Y	N	N	N	N	N	N
Cebolla	1993	N	N	N	N	Y	Y	N	N	Y	N	N	N
Charles C. Deam	1996	N	N	Y	N	N	Y	Y	N	Y	Y	N	N
Cheaha	1992	Y	N	N	N	N	Y	N	Y	N	N	Y	N
Clonts (1994)	1991	Y	N	N	N	N	Y	N	Y	Y	Y	N	N
Chiricahua	1992	N	N	Y	N	N	Y	Y	Y	Y	Y	Y	N
Chuck River	1991	Y	N	N	N	N	Y	Y	N	N	Y	N	N
Chumash	1999	N	Y	N	N	N	Y	N	N	N	N	N	N
Clearwater	1970	Y	N	Y	N	N	Y	N	Y	Y	N	Y	Y
Clifty	1980	Y	N	N	N	N	Y	Y	N	Y	Y	N	N
Cloud Peak	1986	N	N	N	Y	N	Y	N	Y	Y	N	Y	N
Cohutta	1995	Y	N	N	Y	N	Y	Y	Y	Y	Y	N	Y
Collegiate Peaks	1980	Y	N	N	Y	Y	Y	Y	Y	Y	Y	N	N
Colonel Bob	1994	Y	N	N	N	N	Y	Y	N	Y	Y	N	Y
Comanche Peak	1977	Y	N	N	N	Y	Y	N	N	Y	N	N	N
Overton (1991)	1986	N	N	Y	N	N	Y	Y	N	N	N	Y	N
Coronation Island	1989	N	N	N	N	Y	Y	N	N	N	N	N	N
Cranberry	1991	Y	N	N	N	N	Y	Y	N	Y	N	Y	N
Craters of the Moon National Monument	1994	N	N	Y	N	N	Y	Y	N	N	N	N	N
Cucamonga	1995	N	Y	N	N	N	Y	N	Y	Y	N	N	N
Dark Canyon	1980	Y	N	N	N	N	Y	N	N	Y	N	N	N
Denali	1980	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y
Desolation	1993	Y	N	N	Y	N	Y	Y	Y	Y	N	Y	N
Devils Backbone	1993	Y	N	N	N	N	Y	Y	N	Y	Y	N	N
Diamond Peak	1987	Y	N	Y	N	N	Y	N	Y	Y	Y	N	N
Dick Smith	1999	N	Y	N	N	N	Y	N	N	N	N	N	N
Dinkey Lakes	1980	N	N	Y	Y	N	Y	N	N	Y	Y	N	Y
Dolly Sods	1991	Y	N	Y	N	N	Y	Y	Y	Y	Y	Y	Y
Hall (1989)	1987	Y	N	N	N	N	Y	Y	N	Y	Y	Y	N
Dome	1998	Y	N	N	N	N	Y	N	N	N	N	N	N
Domeland	1972	Y	N	N	N	N	Y	Y	N	N	N	N	N
Eagle Cap													
Cole (1977)	1974	N	Y	N	N	N	Y	N	N	N	N	Y	N
Cole (1993)	1975	N	Y	N	N	N	Y	N	Y	N	N	N	N
Cole and Fichtler (1983)	1978	N	N	N	Y	N	Y	Y	Y	N	N	Y	N

Appendix B (continued)

Wilderness	Earliest date	All/entire	All/portion	Sample/entire	Sample/portion	Opportunistic	Locations	Photopoints	Condition Class	Categorical	Quick measures	Detailed measures	GIS
Cole (1982a)	1979	N	N	N	Y	N	Y	Y	Y	N	N	Y	N
Cole (1986b)	1979	N	N	Y	N	N	Y	N	N	Y	N	Y	N
Cole and Hall (1992)	1979	N	N	N	Y	N	Y	N	N	N	N	Y	N
Cole and Marion (1986)	1979	N	N	Y	N	N	Y	N	N	Y	N	Y	N
Cole (1982c)	1980	N	Y	N	N	N	Y	N	Y	Y	N	N	N
Hall and Shelby (1994)	1993	N	N	Y	N	N	Y	N	N	Y	N	Y	N
Cole and Spildie (2000)	1995	N	N	N	Y	N	Y	N	N	N	N	Y	Y
Eagles Nest	1991	Y	N	N	N	N	Y	N	Y	Y	Y	N	N
East Humboldts	1993	Y	N	N	N	N	Y	N	N	Y	Y	N	N
Ellicott Rock	1993	N	N	N	Y	N	Y	N	N	Y	N	N	N
Emigrant	1980	Y	N	N	N	N	Y	N	Y	Y	N	Y	Y
Encampment River	1989	Y	N	N	N	N	Y	Y	Y	N	N	N	N
Fitzpatrick	1987	Y	N	Y	N	N	Y	Y	Y	Y	Y	N	N
Flat Tops	1975	Y	N	Y	N	N	Y	Y	Y	Y	Y	N	N
Flatside	1990	N	N	Y	N	N	Y	Y	N	N	Y	N	N
Fossil Ridge	1997	Y	N	N	N	N	Y	N	Y	N	N	N	N
Fossil Springs	1988	N	N	N	Y	N	Y	Y	Y	Y	N	N	N
Four Peaks	Unknown	N	N	N	N	Y	Y	Y	N	Y	Y	N	N
Frank Church-River of No Return	1970	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
Coombs (1976)	1975	N	N	N	Y	N	Y	Y	N	N	Y	N	N
Garcia	1960	Y	N	N	N	N	Y	N	N	N	N	N	N
Garden of the Gods													
McEwen and others (1996)	1994	Y	N	N	N	N	Y	N	Y	Y	Y	N	N
Gates of the Arctic	1996	Y	N	N	N	N	Y	N	N	Y	Y	Y	Y
Gates of the Mountains	1990	Y	N	N	N	N	Y	N	N	N	N	N	N
Gearhart Mountain	1990	N	Y	N	N	N	Y	N	Y	Y	Y	N	N
Gee Creek	1980	Y	N	N	N	N	Y	Y	N	N	N	N	N
Gila	1980	Y	N	Y	Y	N	Y	Y	Y	Y	Y	N	N
Glacier Peak	1970	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
Thornburgh (1962)	1961	N	N	N	Y	N	Y	N	N	Y	Y	Y	N
Glacier View	1990	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	N
Goat Rocks	1990	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Golden Trout	1972	Y	N	N	N	N	Y	Y	N	N	N	N	N
Gospel-Hump	1990	Y	N	N	N	N	Y	Y	Y	Y	N	Y	N
Granite Chief	1994	Y	N	N	N	N	Y	N	Y	Y	Y	N	N
Granite Mountain	1998	Y	N	N	N	N	Y	N	Y	Y	Y	N	N
Great Bear	1980	Y	N	N	N	N	Y	N	Y	Y	Y	Y	N
Weesner (1990)	1981	N	Y	N	N	N	Y	N	Y	Y	Y	N	N
Great Gulf	1999	N	N	N	Y	N	Y	Y	N	Y	Y	N	Y
Great Sand Dunes	1995	Y	N	N	N	N	Y	N	Y	Y	Y	N	N
Greenhorn Mountain	1995	Y	N	N	N	N	Y	N	Y	Y	Y	N	N
Gros Ventre	1989	Y	N	N	N	N	Y	Y	N	N	N	N	N
Guadalupe Mountains	1988	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N
Hawaii Volcanoes	1999	Y	N	N	N	N	Y	N	N	N	N	N	Y
Headwaters	1992	Y	N	N	N	N	Y	N	Y	Y	Y	N	N
Hells Canyon (ID/OR)	1993	Y	N	Y	N	N	Y	Y	Y	Y	Y	N	Y
Henry M. Jackson	1970	Y	N	Y	N	Y	Y	Y	N	Y	Y	Y	Y
Hercules-Glades	1993	Y	N	N	N	N	Y	Y	N	Y	Y	N	N
McEwen and others (1996)	1994	Y	N	N	N	N	Y	N	Y	Y	Y	N	N
Hickory Creek	1993	Y	N	N	N	N	Y	Y	Y	Y	Y	N	Y
High Uintas	1970	Y	Y	N	Y	N	Y	Y	Y	Y	Y	N	N
Rogers (1986)	1985	N	N	N	Y	N	Y	N	Y	Y	Y	N	N
Holy Cross	1980	Y	N	N	Y	Y	Y	Y	Y	Y	N	Y	N
Hoover	1981	Y	N	N	Y	N	Y	N	N	Y	Y	N	N
Hunter-Fryingpan	1989	Y	N	N	N	N	Y	Y	Y	Y	N	N	N

Appendix B (continued)

Wilderness	Earliest date	All/entire	All/portion	Sample/entire	Sample/portion	Opportunistic	Locations	Photopoints	Condition Class	Categorical	Quick measures	Detailed measures	GIS
Hurricane Creek	1992	N	N	Y	N	N	Y	Y	Y	Y	Y	Y	N
Huston Park	1989	Y	N	N	N	N	Y	Y	Y	N	N	N	N
Indian Heaven	1990	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	N
Indian Peaks	1979	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N
Johnson (1989)	1989	N	Y	N	N	N	Y	N	Y	Y	N	N	N
Irish	1993	Y	N	N	N	N	Y	Y	N	Y	Y	N	N
Ishi	1995	N	Y	N	N	N	Y	Y	N	Y	Y	N	N
Isle Royale													
Farrell and Marion (1998)	1996	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	N
Farrell and Marion (2000)	1996	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	N
James River Face	1990	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Leung and Marion (2000)	Unknown	Y	N	N	N	N	Y	N	Y	Y	Y	Y	N
Jarbidge	1992	Y	N	N	N	N	Y	N	N	Y	Y	N	N
Jedediah Smith	1991	N	Y	N	N	N	Y	Y	N	N	N	N	N
John Muir	1974	Y	Y	Y	N	N	Y	N	Y	Y	Y	N	Y
Dykema (1971)	Unknown	N	N	N	Y	N	Y	N	N	N	Y	Y	N
Joyce Kilmer-Slickrock	1987	N	N	Y	N	N	Y	Y	N	Y	N	N	N
Juniper Mesa	1998	Y	N	N	N	N	Y	N	N	N	N	N	N
Kachina Peaks	1990	N	N	Y	Y	N	Y	Y	N	Y	Y	N	N
Kaiser	1980	N	N	Y	Y	N	Y	N	N	Y	Y	N	Y
Kalmiopsis	1988	Y	Y	N	N	N	Y	N	N	Y	Y	N	N
Kanab Creek	1999	N	N	Y	N	N	Y	N	N	Y	N	Y	N
Karta River	1989	N	N	N	N	Y	Y	N	N	N	N	N	N
Kendrick Mountain	1994	Y	N	N	N	N	Y	N	N	N	N	N	N
Kiavah	1972	Y	N	N	N	N	Y	Y	N	N	N	N	N
Kimberling Creek	1990	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Leung and Marion (2000)	Unknown	Y	N	N	N	N	Y	N	Y	Y	Y	Y	N
Kootznoowoo	1980	N	Y	N	N	N	Y	Y	N	Y	Y	Y	N
Kuiu	1990	Y	N	N	N	Y	Y	Y	N	Y	Y	Y	Y
La Garita	1990	Y	N	Y	N	N	Y	Y	Y	Y	Y	N	N
Lake Chelan-Sawtooth	1980	Y	N	N	N	N	Y	Y	N	Y	Y	Y	N
Lake Clark	1982	N	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y
Lassen Volcanic	1980	N	Y	N	N	N	Y	N	N	Y	Y	N	N
Lee Metcalf	1978	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y
Brown and Schomaker (1974)	1972	N	Y	N	N	N	Y	N	N	Y	Y	N	N
Cole (1993)	1972	N	Y	N	N	N	Y	N	Y	N	N	N	N
Frissell (1973)	1972	N	N	Y	N	N	Y	N	N	Y	Y	N	N
Lewis Fork	1990	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Leung and Marion (2000)	Unknown	Y	N	N	N	N	Y	N	Y	Y	Y	Y	N
Linville Gorge	1999	Y	N	N	N	N	Y	N	N	Y	Y	N	Y
Little Dry Run	1990	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Leung and Marion (2000)	Unknown	Y	N	N	N	N	Y	N	Y	Y	Y	Y	N
Little Frog Mountain	1995	Y	N	N	N	N	Y	Y	N	Y	Y	N	N
Little Wilson Creek	1990	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Leung and Marion (2000)	Unknown	Y	N	N	N	N	Y	N	Y	Y	Y	Y	N
Lone Peak	1989	Y	N	N	N	N	Y	Y	Y	Y	N	Y	N
Lost Creek	1996	Y	N	N	N	N	Y	N	Y	Y	Y	N	N
Lye Brook	1995	N	Y	N	Y	N	Y	N	Y	N	N	N	N
Machesna Mountain	1960	Y	N	N	N	N	Y	N	N	N	N	N	N
Mackinac	1999	Y	N	N	N	N	Y	N	N	Y	N	N	N
Marble Mountain	1980	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y	N
Mark O. Hatfield	1994	Y	N	N	N	N	Y	N	N	N	Y	Y	N
Mark Trail	1995	Y	N	N	N	N	Y	Y	Y	Y	N	Y	N
Maroon Bells-Snowmass	1989	Y	N	N	N	N	Y	Y	Y	Y	Y	N	N
Matilija	Unknown	N	N	N	Y	N	Y	N	N	N	N	N	N

Appendix B (continued)

Wilderness	Earliest date	All/entire	All/portion	Sample/entire	Sample/portion	Opportunistic	Locations	Photopoints	Condition Class	Categorical	Quick measures	Detailed measures	GIS
Maurille Islands	1989	N	N	N	N	Y	Y	N	N	N	N	N	N
Mazatzal	1992	N	Y	Y	N	N	Y	N	Y	Y	N	N	N
McCormick	1994	Y	N	N	N	N	Y	N	Y	N	N	N	N
Menagerie	1992	N	N	Y	N	N	Y	N	N	Y	Y	N	N
Middle Prong	1998	N	N	Y	N	N	Y	Y	N	N	Y	Y	Y
Middle Santiam	1992	N	N	Y	N	N	Y	N	N	Y	Y	N	N
Mill Creek	1987	N	N	Y	N	N	Y	N	N	N	N	N	N
Miller Peak	1990	Y	N	N	N	N	Y	N	N	Y	Y	N	N
Mission Mountains	Unknown	N	N	Y	N	N	Y	N	N	Y	Y	N	N
Misty Fjords National Monument	1989	N	N	Y	Y	N	Y	Y	N	Y	Y	N	Y
Mokelumne	1980	Y	Y	N	N	N	Y	N	Y	Y	N	Y	Y
Mollie Beattie	1994	N	N	N	Y	N	Y	Y	Y	Y	N	Y	N
Monarch	1999	N	N	Y	N	N	Y	N	N	Y	N	N	Y
Monument Rock	1995	Y	N	N	N	N	Y	N	N	Y	N	N	N
Mount Adams	1990	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	N
Mount Baker	1970	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y
Mount Baldy	Unknown	N	N	Y	N	N	Y	N	N	Y	Y	N	N
Mount Evans	1996	Y	N	N	N	N	Y	N	Y	Y	Y	N	N
Mount Hood	1980	Y	N	Y	N	N	Y	N	N	Y	Y	Y	N
Mount Jefferson	1980	Y	N	N	N	N	Y	N	N	Y	Y	Y	N
Cole and others (1997)	1991	N	Y	N	N	N	Y	N	Y	Y	Y	N	N
Mount Massive	1980	Y	N	N	Y	Y	Y	N	N	Y	N	N	N
Mount Naomi	1993	N	N	Y	N	N	Y	N	Y	N	Y	N	N
Mount Nebo	1995	Y	N	N	N	N	Y	Y	Y	Y	N	Y	N
Mount Rainier	1970	N	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y
Thornburgh (1962)	1961	N	N	N	Y	N	Y	N	N	Y	Y	Y	N
Rochefort and Swinney (2000)	1988	N	Y	N	N	N	Y	N	Y	N	Y	Y	Y
Mount Skokomish	1970	Y	N	Y	N	N	Y	N	Y	Y	N	N	N
Mount Sneffels	1985	Y	Y	N	N	N	Y	N	Y	Y	N	N	N
Mount Thielsen	Unknown	N	N	Y	N	N	Y	N	Y	Y	Y	N	N
Mount Timpanogos	1989	Y	N	N	N	N	Y	Y	Y	Y	N	Y	N
Mount Washington	1980	Y	N	N	N	N	Y	N	N	Y	N	N	N
Mount Zirkel	1980	Y	N	Y	Y	N	Y	Y	Y	Y	Y	N	N
Mountain Lake	1990	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Leung and Marion (2000)	Unknown	Y	N	N	N	N	Y	N	Y	Y	Y	Y	N
Mountain Lakes	1994	Y	N	N	N	N	Y	Y	N	Y	N	Y	Y
Mt. Rose	1994	Y	N	N	N	N	Y	N	N	N	N	N	Y
Mt. Shasta	1989	N	Y	N	N	N	Y	N	N	Y	Y	N	N
Muggins Mountain	1992	Y	N	N	N	N	Y	N	N	N	N	N	N
Munds Mountain	1988	N	N	N	Y	N	Y	Y	Y	Y	N	N	N
Neota	1993	Y	N	N	N	N	Y	N	N	N	N	N	N
Never Summer	1980	Y	N	Y	N	N	Y	Y	Y	N	N	N	N
Noatak	1998	N	N	N	Y	N	Y	Y	Y	Y	N	Y	Y
Noisy-Diobsud	1970	Y	N	N	Y	N	Y	Y	N	Y	Y	Y	Y
Nordhouse Dunes	1994	Y	N	N	N	N	Y	Y	N	Y	N	Y	N
Norse Peak	1970	Y	N	Y	N	N	Y	Y	Y	Y	Y	Y	Y
North Absaroka	1977	Y	N	N	N	N	Y	Y	N	Y	Y	N	N
North Fork John Day	1992	Y	Y	N	N	N	Y	Y	N	Y	Y	Y	N
North Fork Umatilla	1980	Y	N	N	N	N	Y	N	N	Y	Y	N	N
Olympic	1988	Y	N	N	N	N	Y	Y	N	N	Y	Y	N
Moorhead and Schreiner (1979)	1970	N	N	Y	N	N	Y	N	N	Y	Y	N	N
Schreiner and Moorhead (1976)	1970	Y	N	N	N	N	Y	N	N	N	Y	Y	N
Schreiner and Moorhead (1979)	1970	Y	N	N	N	N	Y	N	N	N	Y	Y	N
Simon (1978)	1973	N	N	Y	N	N	Y	N	N	Y	Y	N	N

Appendix B (continued)

Wilderness	Earliest date	All/entire	All/portion	Sample/entire	Sample/portion	Opportunistic	Locations	Photopoints	Condition Class	Categorical	Quick measures	Detailed measures	GIS
Otter Creek	1990	N	N	N	Y	N	Y	Y	N	Y	N	Y	N
Paddy Creek	1993	Y	N	N	N	N	Y	Y	N	Y	Y	N	N
Paria Canyon-Vermilion Cliffs	1994	Y	N	Y	N	N	Y	N	Y	Y	Y	Y	N
Pasayten	1993	N	N	Y	N	N	Y	Y	N	N	N	N	N
Pecos	1986	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
Pemigewasset	1997	N	Y	N	N	N	Y	N	N	N	Y	N	Y
Peru Peak	1995	N	N	N	Y	N	Y	N	Y	N	N	N	N
Peters Mountain	1990	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Leung and Marion (2000)	Unknown	Y	N	N	N	N	Y	N	Y	Y	Y	Y	N
Petersburg Creek-Duncan Salt Chuck	1990	Y	N	N	N	Y	Y	Y	N	Y	Y	Y	Y
Pine Valley Mountain	Unknown	N	N	Y	N	N	Y	N	N	N	N	N	N
Piney Creek	1993	Y	N	N	N	N	Y	Y	N	Y	Y	N	N
Platte River	1980	Y	Y	N	Y	N	Y	Y	Y	Y	Y	N	N
Pond Mountain	1992	N	N	N	Y	N	Y	Y	N	Y	Y	N	N
Popo Agie	1987	Y	N	Y	N	N	Y	Y	Y	Y	Y	N	N
Porcupine Lake	1985	Y	N	N	N	N	Y	N	Y	Y	N	N	N
Powderhorn	1980	Y	N	N	N	N	Y	N	Y	Y	Y	Y	N
Ptarmigan Peak	1991	Y	N	N	N	N	Y	N	Y	Y	Y	N	N
Pusch Ridge	1985	Y	N	N	N	N	Y	N	Y	Y	Y	N	N
Raggeds	1989	Y	N	N	N	N	Y	Y	Y	Y	Y	N	N
Rainbow Lake	1995	N	N	N	Y	N	Y	Y	N	N	Y	Y	N
Ramseys Draft													
Gentile and others (1990)	1991	Y	N	N	N	N	Y	N	Y	Y	N	Y	N
Gentile and others (1992)	1992	Y	N	N	N	N	Y	N	Y	Y	Y	N	N
Rattlesnake	1993	Y	N	N	N	N	Y	Y	Y	Y	Y	N	N
Cole and Fichtler (1983)	1978	N	N	N	Y	N	Y	Y	Y	N	N	Y	N
Fichtler (1980)	1978	N	N	Y	N	N	Y	Y	N	Y	Y	Y	N
Raven Cliffs	1999	Y	N	N	N	N	Y	N	N	Y	N	N	N
Chappell (1999)	1999	N	N	Y	N	N	Y	N	Y	N	Y	N	N
Rawah	1977	Y	N	N	N	N	Y	N	N	Y	N	N	N
Red Buttes	1990	Y	N	N	N	N	Y	Y	N	Y	Y	Y	Y
Red Rock-Secret Mountain	1988	N	N	N	Y	N	Y	Y	Y	Y	N	N	N
Richland Creek	1992	N	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y
Rock River Canyon	1997	Y	N	N	N	N	Y	N	N	N	N	N	N
Rockpile Mountain	1993	Y	N	N	N	N	Y	Y	N	Y	Y	N	N
Rogue-Umpqua Divide	1989	N	Y	N	N	N	Y	Y	N	Y	Y	N	N
Round Island	1999	Y	N	N	N	N	Y	N	N	Y	N	N	N
Ruby Mountains	1993	Y	N	N	N	N	Y	N	N	Y	Y	N	N
Russell Fjord	Unknown	N	N	Y	N	N	Y	Y	N	N	N	N	N
Russian	1993	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y	N
Saguaro	1992	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	N
Saint Mary's													
Gentile and others (1990)	1990	Y	N	N	N	N	Y	N	Y	Y	N	Y	N
Gentile and others (1991)	1991	Y	N	N	N	N	Y	N	Y	Y	N	Y	N
Gentile and others (1992)	1992	Y	N	N	N	N	Y	N	Y	Y	Y	N	Y
Salmon-Huckleberry	1994	Y	N	N	N	N	Y	N	N	N	Y	Y	N
Salmo-Priest	1993	Y	N	N	N	N	Y	Y	Y	Y	N	Y	N
Salome	1994	Y	N	N	N	N	Y	N	N	Y	N	N	N
Salt River Canyon	1989	N	Y	N	N	N	Y	N	Y	Y	N	N	N
Sampson Mountain	1989	Y	N	N	N	N	Y	Y	Y	Y	Y	N	N
San Gabriel	1995	Y	N	N	N	N	Y	N	Y	Y	N	N	N
San Jacinto	1991	Y	N	Y	N	N	Y	Y	N	Y	Y	N	N
San Rafael	1960	Y	N	N	N	N	Y	N	N	N	N	N	N
Sangre de Cristo	1991	Y	N	N	N	N	Y	Y	Y	Y	Y	N	N

Appendix B (continued)

Wilderness	Earliest date	All/entire	All/portion	Sample/entire	Sample/portion	Opportunistic	Locations	Photopoints	Condition Class	Categorical	Quick measures	Detailed measures	GIS
Santa Lucia	1960	Y	N	N	N	N	Y	N	N	N	N	N	N
Santa Rosa	1991	N	N	Y	N	N	Y	Y	N	N	N	N	N
Sarvis Creek	1993	N	N	N	Y	N	Y	N	Y	Y	N	N	N
Sawtooth	1970	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	N
Scapegoat	1980	Y	N	Y	N	N	Y	N	N	Y	Y	N	Y
Selway-Bitterroot	1970	Y	N	Y	N	N	Y	Y	Y	Y	Y	Y	Y
Cole (1993)	1977	N	Y	N	N	N	Y	Y	Y	N	N	N	N
Cole and Ranz (1983)	1977	N	Y	N	N	N	Y	N	Y	N	Y	N	N
Ranz (1979)	1977	N	Y	N	N	N	Y	N	N	N	N	Y	N
Spildie and others (2000)	1993	N	Y	N	N	N	Y	N	N	Y	Y	Y	N
Sequoia-Kings Canyon													
Parsons and Stohlgren (1987)	1976	Y	N	N	N	N	Y	N	Y	Y	N	N	N
Stohlgren and Parsons (1992)	1977	Y	N	N	N	N	Y	N	Y	N	Y	N	N
Simon (1978)	1977	N	N	N	Y	N	Y	N	N	N	N	Y	N
Scuderi (1981)	1979	N	Y	N	N	N	Y	N	N	Y	N	N	N
Stohlgren (1982)	1980	N	N	N	N	Y	N	N	N	N	N	Y	N
Stohlgren (1986)	1980	N	N	N	N	Y	N	N	N	N	N	Y	N
Stohlgren and Parsons (1986)	1980	N	N	N	N	Y	N	N	N	N	N	Y	N
Sespe	1999	N	Y	N	Y	N	Y	N	N	N	N	N	N
Shawvers Run	1990	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Leung and Marion (2000)	Unknown	Y	N	N	N	N	Y	N	Y	Y	Y	Y	N
Sheep Mountain	1995	Y	N	N	N	N	Y	N	Y	Y	N	N	N
Shenandoah													
Marion and Haskell (1988)	1981	Y	N	N	N	N	Y	N	N	Y	N	N	N
Williams (1994)	1992	Y	N	N	N	N	Y	N	Y	N	Y	Y	N
Williams and Marion (1995)	1992	Y	N	N	N	N	Y	N	Y	N	Y	Y	N
Shining Rock	1998	N	N	Y	N	N	Y	Y	N	N	Y	Y	Y
Saunders (1985)	1976	N	N	N	Y	N	Y	N	N	Y	Y	Y	N
Saunders (1986)	1976	N	N	N	Y	N	Y	N	N	Y	N	Y	N
Roggenbuck and Berrier (1980)	1979	N	Y	N	N	N	Y	N	N	Y	N	N	N
Sierra Ancha	1994	Y	N	N	N	N	Y	N	N	Y	N	N	N
Silver Peak	1979	Y	N	N	N	N	Y	Y	N	Y	Y	Y	N
Sipsey	1992	Y	N	Y	N	N	Y	N	Y	Y	Y	Y	N
Clonts (1994)	1991	Y	N	N	N	N	Y	N	Y	Y	Y	N	N
Siskiyou	1980	Y	N	N	N	N	Y	N	N	Y	Y	N	N
Sky Lakes	1985	Y	N	N	Y	N	Y	Y	N	Y	N	Y	Y
Snow Mountain	1989	Y	N	N	N	N	Y	N	Y	Y	Y	N	N
South Baranof	1986	N	N	N	Y	N	Y	N	N	Y	N	N	N
South Etolin	1997	Y	N	N	N	N	Y	Y	N	N	Y	Y	N
South San Juan	1986	Y	Y	N	N	N	Y	N	Y	Y	Y	N	Y
South Sierra	Unknown	Y	N	N	N	N	Y	Y	N	N	N	N	N
South Warner	1980	Y	N	Y	N	N	Y	Y	Y	Y	Y	N	Y
Southern Nantahala	1994	Y	N	N	Y	N	Y	N	Y	Y	Y	N	N
Stephen Mather	1980	N	Y	N	N	N	Y	Y	Y	N	Y	Y	N
Gettinger and others (1998)	1980	Y	N	N	N	N	Y	N	N	N	Y	Y	N
Stikine-LeConte	1999	N	N	N	Y	N	Y	Y	N	N	Y	Y	N
Strawberry Mountain	1995	Y	N	N	N	N	Y	N	N	Y	N	N	N
Sturgeon River Gorge	1994	Y	N	N	N	N	Y	N	Y	N	N	N	N
Superstition	1994	N	N	Y	N	N	Y	Y	N	Y	Y	N	N
Sycamore Canyon	1988	Y	N	N	Y	N	Y	Y	Y	Y	Y	N	N
Sylvania	1994	Y	N	N	N	N	Y	Y	N	Y	N	Y	N
Table Mountain	1993	Y	N	N	N	N	Y	N	Y	Y	N	N	N
Table Rock	1988	Y	N	N	N	N	Y	Y	N	N	N	Y	N
Tatoosh	1990	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	N

Appendix B (continued)

Wilderness	Earliest date	All/entire	All/portion	Sample/entire	Sample/portion	Opportunistic	Locations	Photopoints	Condition Class	Categorical	Quick measures	Detailed measures	GIS
Tebenkof Bay	1990	Y	N	N	N	Y	Y	Y	N	Y	Y	Y	Y
Teton	1978	N	N	Y	Y	N	Y	N	Y	Y	N	N	N
The Brothers	1970	Y	N	Y	N	N	Y	N	Y	Y	N	N	N
Thousand Lakes	1980	Y	N	N	N	N	Y	N	N	Y	N	N	N
Three Sisters	1980	Y	N	N	N	N	Y	N	N	Y	N	Y	N
Cole and others (1997)	1991	N	Y	N	N	N	Y	N	Y	Y	Y	N	N
Thunder Ridge	1990	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Thunder Ridge	Unknown	Y	N	N	N	N	Y	N	Y	Y	Y	Y	N
Togiak	1992	N	N	N	N	Y	N	N	N	Y	N	N	N
Tracy Arm-Fords Terror	1990	Y	N	N	N	N	Y	Y	N	N	Y	N	N
Trapper Creek	1990	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	N
Tray Mountain	1995	Y	N	N	N	N	Y	Y	Y	Y	N	Y	N
Trinity Alps	1993	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y	N
Unaka Mountain	1989	Y	N	N	N	N	Y	Y	Y	Y	Y	N	N
Uncompahgre	1990	Y	N	N	N	N	Y	N	Y	N	N	N	N
Upper Buffalo	1992	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	N
McEwen and others (1996)	1994	Y	N	N	N	N	Y	N	Y	Y	Y	N	N
Upper Kiamichi River	1995	Y	N	N	N	N	Y	N	Y	Y	Y	Y	Y
Huff (1995)	1994	N	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y
Ventana	1999	Y	N	N	N	N	Y	Y	N	Y	Y	Y	N
Waldo Lake	1997	Y	N	N	N	N	Y	N	Y	Y	N	N	N
Warren Island	1989	N	N	N	N	Y	Y	N	N	N	N	N	N
Washakie	1977	Y	N	Y	N	N	Y	Y	Y	Y	Y	N	N
Wellsville Mountain	1993	N	N	Y	N	N	Y	N	Y	N	Y	N	N
Weminuche	1980	Y	Y	N	N	N	Y	N	Y	Y	Y	N	Y
Wenaha-Tucannon	1980	Y	N	N	N	N	Y	Y	N	Y	N	N	N
West Chichagof-Yakobi	1986	N	N	N	Y	N	Y	N	N	Y	N	N	N
West Clear Creek	1988	N	N	N	Y	N	Y	Y	Y	Y	N	N	N
West Elk	1980	Y	Y	N	N	N	Y	N	Y	Y	Y	N	N
West Malpais	1993	N	N	N	N	Y	Y	N	N	Y	N	N	N
Wet Beaver	1988	N	N	N	Y	N	Y	Y	Y	Y	N	N	N
Whisker Lake	1992	Y	N	N	N	N	Y	N	Y	Y	Y	N	N
White Mountain	1997	N	N	Y	N	N	Y	N	N	Y	Y	N	N
Wild Rogue	Unknown	N	N	N	Y	N	Y	N	N	N	N	N	N
William O. Douglas	1990	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Wonder Mountain	1970	Y	N	Y	N	N	Y	N	Y	Y	N	N	N
Wrangell-St. Elias	1980	N	Y	N	N	N	Y	Y	N	Y	Y	N	N
Yolla Bolly-Middle Eel	1992	N	N	Y	N	N	Y	Y	Y	Y	Y	Y	N
Yosemite	1972	Y	N	Y	N	N	Y	Y	Y	Y	N	N	N
Boyers and others (2000)	1972	Y	N	N	N	N	Y	Y	Y	Y	Y	N	N
Holmes (1973)	1972	Y	N	N	N	N	Y	N	N	N	Y	N	N
Sydoriak (1986)	1983	Y	N	N	N	N	Y	Y	Y	Y	N	N	N
Moritsch and Muir (1993)	1990	N	N	N	N	Y	N	N	N	N	N	Y	N
Eagan and Newman (1999)	1990	N	N	N	N	Y	N	N	N	N	N	Y	N

Appendix C: Earliest date, sample type, survey technique, and data characteristics of baseline trail impact data available for each wilderness with trail data. If no citation is given, data are unpublished. Characteristics of all unpublished data for each wilderness have been combined in a single row. If the row following the wilderness name is blank, there is no unpublished data. See text for definitions of sample type, survey technique, and data characteristics.

Wilderness	Earliest date	All/entire	All/portion	Sample/entire	Sample/portion	Opportunistic	Social trails	Continue/entire	Continue/sample	Sample points	Photopoints	Condition class	Spatial extent	Severity	GIS
Alpine Lakes															
Cole and others (1997)	1991	N	Y	N	N	N	Y	Y	N	N	N	Y	Y	N	N
Ansel Adams	1999	N	N	N	N	Y	Y	N	N	N	N	N	Y	N	Y
Bandelier	1993	Y	N	N	N	N	N	Y	N	N	N	Y	Y	Y	N
Black Elk	1996	Y	N	N	N	N	N	N	N	Y	Y	N	N	Y	N
Blue Range	1995	Y	N	N	N	N	Y	N	N	N	N	Y	N	N	N
Box-Death Hollow	Unk	N	N	N	Y	N	Y	N	Y	N	Y	N	Y	Y	N
Cabeza Prieta	1998	N	N	N	Y	N	Y	N	Y	N	Y	N	Y	Y	N
Charles C. Deam	1996	N	N	N	N	Y	N	N	Y	N	N	N	Y	Y	N
Clifty	1980	Y	N	N	N	N	N	N	N	Y	Y	N	Y	N	N
Cohutta	Unk	Y	N	N	N	N	N	N	N	Y	N	Y	N	N	N
Colonel Bob	1994	Y	N	N	N	N	Y	Y	N	N	N	Y	N	N	N
Cranberry	1991	N	N	N	Y	N	N	N	N	Y	N	N	Y	Y	N
Denali	1976	N	N	N	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N
Dolly Sods	1991	N	N	N	Y	N	N	N	N	Y	N	N	Y	Y	N
Hall (1989)	1987	N	N	Y	Y	N	N	N	N	Y	N	N	N	Y	N
Domeland	1972	Y	N	N	N	N	N	N	N	Y	Y	N	N	N	N
Fitzpatrick	1982	Y	N	N	N	N	N	N	N	Y	Y	N	N	N	N
Gila	1995	Y	N	N	N	N	Y	N	N	N	N	Y	N	N	N
Golden Trout	1972	Y	N	N	N	N	N	N	N	Y	Y	N	N	N	N
Gros Ventre	1999	N	N	N	Y	N	N	Y	N	N	Y	Y	N	N	Y
Guadalupe Mountains															
Fish & Brothers (1981)	1979	N	N	Y	N	N	Y	N	N	Y	N	N	Y	Y	N
Indian Peaks	1987	N	N	N	Y	N	N	N	N	Y	Y	N	N	N	N
John Muir	1999	N	N	N	N	Y	Y	N	N	N	N	N	N	N	Y
Kiavah	1972	Y	N	N	N	N	N	N	N	Y	Y	N	N	N	N
Kuiu	1997	Y	N	N	N	N	N	N	Y	N	Y	N	N	N	N
Lee Metcalf															
Dale (1973)	1971	N	N	Y	N	N	N	N	N	Y	Y	N	N	Y	N
Lewis Fork	Unk	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N
Linville Gorge	1999	Y	N	N	N	N	Y	Y	N	N	N	Y	N	N	Y
Little Dry Run	Unk	Y	N	N	N	N	0	Y	N	N	N	Y	N	N	N
Little Wilson Creek	Unk	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N
Manzano Mountain	1995	Y	N	N	N	N	N	Y	N	N	N	N	N	Y	Y
Mill Creek	Unk	N	N	N	N	Y	N	N	Y	N	N	N	N	Y	N
Mount Jefferson															
Cole and others (1997)	1991	N	Y	N	N	N	Y	Y	N	N	N	Y	Y	N	N
Mount Rainier	1986	N	N	N	Y	N	Y	Y	N	N	N	N	N	Y	N
Rochefort & Swinney (2000)	1988	N	N	N	Y	N	Y	N	Y	N	N	N	Y	Y	Y
Mount Timpanogos	1993	Y	N	N	N	N	Y	N	Y	N	Y	N	Y	N	N
Mountain Lakes	1996	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	Y
Never Summer	1987	N	N	N	Y	N	N	N	N	Y	Y	N	N	N	N
North Absaroka	1964	Y	N	N	N	N	N	N	N	Y	Y	N	N	N	N
Olympic	1980	N	N	N	Y	N	Y	Y	N	N	N	N	Y	Y	N
Petersburg Creek-Duncan															
Salt Chuck	1997	Y	N	N	N	N	N	N	Y	N	Y	N	N	N	N

Appendix C (continued)

Wilderness	Earliest date	All/entire	All/portion	Sample/entire	Sample/portion	Opportunistic	Social trails	Continue/entire	Continue/sample	Sample points	Photopoints	Condition class	Spatial extent	Severity	GIS
Rattlesnake	1996	N	N	Y	N	N	N	Y	N	N	N	N	N	Y	N
Raven Cliffs	1999	N	N	Y	N	N	N	N	N	Y	N	N	Y	Y	N
Chappell (1999)	1999	N	N	Y	N	N	N	N	N	N	N	Y	N	N	N
Sangre de Cristo	1997	N	N	N	Y	N	N	N	Y	N	N	N	N	Y	N
Selway-Bitterroot	1980	N	N	N	N	Y	N	N	Y	N	N	Y	N	N	N
Helgath (1974, 1975)	1972	N	N	N	N	N	N	N	N	Y	N	N	N	Y	N
Cole (1983b)	1978	N	N	N	Y	N	N	Y	N	Y	N	N	Y	Y	N
Cole (1991)	1978	N	N	N	N	N	N	N	N	Y	N	N	N	Y	N
Shenandoah	1999	N	N	Y	N	N	N	N	Y	Y	N	N	Y	Y	N
Hall and Kuss (1989)	1985	N	N	Y	N	Y	N	N	N	Y	N	N	N	Y	N
Sky Lakes	1996	Y	N	N	N	N	N	Y	N	N	N	Y	N	N	N
South Sierra	1972	Y	N	N	N	N	N	N	N	Y	Y	N	N	N	N
Stephen Mather	1990	N	N	N	Y	N	Y	Y	N	N	N	Y	N	Y	N
Superstition	1985	N	N	Y	N	N	N	Y	Y	N	Y	N	Y	Y	N
Table Rock	1988	N	N	N	Y	N	N	N	N	Y	Y	N	N	N	N
Tebenkof Bay	1997	Y	N	N	N	N	N	N	Y	N	Y	N	N	N	N
Teton	1997	N	N	N	Y	N	N	Y	N	N	Y	Y	Y	N	Y
Three Sisters															
Cole and others (1997)	1991	N	Y	N	N	N	Y	Y	N	N	N	Y	Y	N	N
Tray Mountain	1999	N	N	Y	N	N	N	N	N	Y	N	N	Y	Y	N
Upper Kiamichi River															
Huff (1995)	1994	N	Y	N	N	N	N	N	N	Y	Y	N	N	Y	Y
Washakie	1964	Y	N	N	N	N	N	N	N	Y	Y	N	N	N	N
Yosemite	1972	Y	N	N	N	N	N	N	N	N	N	N	N	Y	N
Holmes (1973)	1972	N	N	N	N	N	N	N	Y	N	N	N	N	Y	N
Sydoriak (1986)	1983	Y	N	N	N	N	N	Y	N	N	Y	Y	Y	Y	N
Eagan and others (2000)	1990	N	N	N	N	N	N	N	N	Y	Y	N	N	Y	N

Appendix D: Earliest date, sample type, and data characteristics of baseline visitor data available for each wilderness with visitor data. If no citation is given, data are unpublished. Characteristics of all unpublished data for each wilderness have been combined in a single row. If the row following the wilderness name is blank, there is no unpublished data. See text for definitions of sample type and data characteristics.

Wilderness	Earliest date	All	Portion	Opportunistic	Main season	Off season	Different seasons	Hikers	Stock users	Water users	Different travel modes	Day users	Overnight users	Different length of stay	General characteristics
Alpine Lakes	1993	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Hendee and others (1977)	1973	N	Y	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Shelby and others (1989)	1988	N	Y	N	Y	Y	N	Y	N	N	N	Y	Y	N	Y
Cole and others (1997)	1991	N	Y	N	Y	N	N	Y	N	N	N	Y	Y	Y	Y
Watson and others (1998a)	1991	N	Y	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Anaconda Pintler															
Jubenville (1971)	1969	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Jubenville (1970)	1970	Y	N	N	Y	N	N	Y	Y	N	Y	Y	Y	Y	Y
Ansel Adams	1996	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	Y	Y
Aravaipa Canyon															
Moore and others (1989)	1987	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Bay Creek	1991	Y	N	N	N	N	N	N	N	N	N	N	N	N	N
Bell Mountain	1998	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Big Frog															
Carlisle (1992)	1992	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Black Elk	1995	Y	N	N	Y	N	N	Y	Y	N	Y	Y	Y	N	Y
Blackjack Springs	1985	N	N	Y	Y	N	N	Y	N	N	N	Y	Y	N	Y
Blood Mountain	1994	N	N	Y	Y	Y	N	Y	N	N	N	Y	Y	Y	Y
Bob Marshall	Unk	N	N	Y	Y	N	N	Y	Y	N	N	N	Y	N	Y
Merriam (1963)	1960	N	N	Y	Y	N	N	Y	Y	N	N	N	Y	N	Y
Wildland Res. Center (1962)	1960	N	N	Y	Y	N	N	Y	Y	N	N	N	Y	N	Y
Bradt (1965)	1964	N	Y	N	Y	N	N	Y	Y	N	Y	Y	Y	Y	Y
Merriam and Ammons (1968)	1964	N	N	Y	Y	N	N	Y	Y	N	N	N	Y	N	Y
Stankey (1973)	1969	Y	N	N	Y	N	N	Y	Y	N	Y	Y	Y	N	Y
Lucas (1980)	1970	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Lucas(1985)	1970	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Fitzhugh (1985)	1982	Y	N	N	Y	N	N	Y	Y	N	Y	Y	Y	N	N
Love and Watson (1992)	1989	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y	N	N
Boulder Creek	1993	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Boundary Waters Canoe Area	1988	Y	N	N	Y	N	N	Y	N	Y	N	Y	Y	N	Y
Bultena and Taves (1961)	1956	N	N	Y	Y	N	N	N	N	Y	N	N	Y	N	N
Taves and others (1960)	1958	N	Y	N	Y	N	N	N	N	Y	N	N	Y	N	Y
Lucas (1962)	1960	Y	N	N	Y	N	N	N	N	Y	N	Y	Y	Y	Y
Lucas (1964a)	1960	Y	N	N	Y	N	N	N	N	Y	Y	Y	Y	N	N
Lucas (1964b)	1960	Y	N	N	Y	N	N	N	N	Y	N	Y	Y	Y	Y
Lucas (1970)	1960	Y	N	N	Y	N	N	N	N	Y	N	Y	Y	Y	Y
Wildland Res. Center (1962)	1960	N	N	Y	Y	N	N	N	N	Y	N	N	Y	N	Y
Watson (1995)	1964	N	Y	N	Y	N	N	N	N	Y	N	N	Y	N	Y
Cole and others (1995)	1969	N	Y	N	Y	N	N	N	N	Y	N	N	Y	N	Y
Stankey (1973)	1969	Y	N	N	Y	N	N	N	N	Y	Y	Y	Y	N	Y
Lime (1972)	1971	Y	N	N	Y	N	N	N	N	Y	N	Y	Y	N	N
Peterson (1971)	1971	N	Y	N	Y	N	N	N	N	Y	N	N	Y	N	Y
Young (1978)	1977	Y	N	N	Y	N	N	N	N	Y	N	N	Y	N	N
Anderson (1980)	1978	Y	N	N	Y	N	N	N	N	Y	N	Y	Y	N	N
Anderson and Brown (1984)	1978	Y	N	N	Y	N	N	N	N	Y	N	Y	Y	N	N
Adelman and others (1982)	1979	N	N	Y	Y	N	N	N	N	Y	N	Y	Y	N	N

Appendix D (continued)

Wilderness	Earliest date	All	Portion	Opportunistic	Main season	Off season	Different seasons	Hikers	Stock users	Water users	Different travel modes	Day users	Overnight users	Different length of stay	General characteristics
Kohls (1986)	1985	N	N	Y	Y	N	N	N	N	Y	N	N	Y	N	N
Christensen and Cole (2000)	1991	Y	N	N	Y	N	N	Y	Y	Y	N	N	Y	N	N
Frissell and Duncan (1965)	Unk	N	N	Y	Y	N	N	N	N	Y	N	N	Y	N	N
Box-Death Hollow	1994	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	Y	Y
Snyder and others (1995)	1993	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Breadloaf	1992	N	N	N	Y	N	N	Y	N	N	N	Y	Y	N	Y
Bridger	1995	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Stankey (1973)	1969	Y	N	N	Y	N	N	Y	Y	N	Y	Y	Y	N	Y
Brown and Haas (1980)	1974	N	Y	N	Y	N	N	Y	N	Y	Y	N	Y	N	Y
Dunwiddie & Heberlein (1976)	1974	N	Y	N	Y	N	N	Y	Y	N	N	N	Y	N	N
Heberlein & Dunwiddie (1979)	1974	N	Y	N	Y	N	N	Y	Y	Y	Y	N	Y	N	Y
Anderson and Manfredo (1986)	1978	Y	N	N	Y	N	N	Y	Y	N	N	N	Y	N	N
Manfredo (1979)	1978	Y	N	N	Y	N	N	Y	Y	N	N	N	Y	N	Y
Hoss and Brunson (2000)	Unk	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y	N	N
Buffalo National River															
Ditton (1979)	1979	N	Y	N	Y	N	N	N	N	Y	N	N	Y	N	Y
Ditton and others (1981)	1979	Y	N	N	Y	N	N	N	N	Y	N	Y	Y	N	Y
Ditton (1981)	1980	N	Y	N	Y	N	N	N	N	Y	N	N	Y	N	Y
Burden Falls	1991	Y	N	N	N	N	N	N	N	N	N	N	N	N	N
Cabinet Mountains															
Lucas (1980)	1970	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Caney Creek	1993	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Watson and others (1992)	1989	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Roggenbuck and others (1993)	1990	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Williams and others (1992a,b)	1990	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Parker and Avant (1999)	1999	Y	N	N	Y	N	N	Y	Y	N	Y	N	N	N	Y
Caribou-Speckled Mountain															
Michael and others (1994)	1993	Y	N	N	Y	N	N	N	N	N	N	N	N	N	N
Castle Crags															
Hoss and Brunson (2000)	Unk	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y	N	N
Charles C. Deam															
Watson and others (1993)	1990	Y	N	N	Y	Y	N	Y	Y	N	Y	Y	Y	N	N
Cheaha															
Clonts (1994)	1991	Y	N	N	Y	Y	N	Y	N	N	N	Y	Y	N	Y
Clonts and others (1998)	1992	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	Y
Clearwater	1993	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Cohutta	1987	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Patterson and Williams (1991)	1989	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Watson and Niccolucci (1992b)	1989	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Watson and others (1992)	1989	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Young (1990)	1989	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Roggenbuck and others (1993)	1990	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Williams and others (1992a,b)	1990	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Shafer (1993)	1992	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Shafer and Hammitt (1995)	1992	Y	N	N	Y	N	N	Y	N	Y	N	Y	Y	N	N
Tarrant and Schafer (1998)	1992	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	Y
Collegiate Peaks	Unk	Y	N	N	N	N	N	N	N	N	N	N	N	N	Y
Tarrant and Schafer (1998)	1994	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	Y
Cranberry	1991	N	N	Y	Y	N	N	Y	N	N	N	Y	Y	N	Y
Echelberger & Moeller (1977)	1972	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	Y
Cucamonga															

Appendix D (continued)

Wilderness	Earliest date	All	Portion	Opportunistic	Main season	Off season	Different seasons	Hikers	Stock users	Water users	Different travel modes	Day users	Overnight users	Different length of stay	General characteristics
Parker and Winter (1998)	1995	Y	N	N	Y	N	N	Y	N	N	N	Y	N	N	Y
Cumberland Island															
Schneider and Hammitt (1995)	1994	Y	N	N	Y	N	N	Y	N	N	N	N	N	N	N
Littlejohn (1999)	1998	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	Y
Dark Canyon															
Snyder and others (1995)	1993	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Death Valley															
Littlejohn (1994)	1994	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Denali															
Bultena and others (1981a)	1978	Y	N	N	Y	N	N	Y	N	N	N	N	Y	Y	Y
Bultena and others (1981b)	1978	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Womble (1981)	1978	Y	N	N	Y	N	N	Y	N	N	N	N	Y	N	Y
Womble and others (1980)	1978	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Anderson (1981)	1980	Y	N	N	Y	N	N	Y	N	N	N	N	Y	N	Y
Ewert (1993)	1990	N	Y	N	Y	N	N	N	N	N	N	N	Y	N	Y
Swanson and others (2002a)	2000	Y	N	N	Y	N	N	Y	N	N	N	N	Y	N	Y
Desolation	1999	N	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Stankey (1980)	1970	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Cole and others (1995)	1972	Y	N	N	N	N	N	Y	N	N	N	Y	Y	Y	Y
Lucas (1980)	1972	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Carpenter and Bowlus (1976)	1973	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Christensen and Cole (2000)	1990	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	N
Watson (1993)	1990	Y	N	N	Y	Y	N	Y	N	N	N	Y	Y	Y	N
Martin (2000)	1997	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	Y	Y
Watson and others (1998c)	1997	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	Y	N
Devils Backbone	1998	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Dolly Sods	1991	N	N	Y	Y	N	N	Y	N	N	N	Y	Y	N	Y
Eagle Cap	1997	Y	N	N	Y	N	N	Y	Y	N	Y	N	N	N	Y
Hendee and others (1968)	1965	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Watson and others (1996)	1965	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Orr (1983)	1982	N	Y	N	Y	N	N	Y	Y	N	N	N	Y	N	Y
Hall and Shelby (1994)	1993	Y	N	N	Y	N	N	Y	Y	N	Y	Y	Y	Y	Y
Eagles Nest															
Haas (1979)	1977	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Ellicott Rock															
Hammitt and Rutlin (1995)	1992	Y	N	N	Y	Y	N	Y	N	N	N	Y	Y	N	Y
Rutland and Hammitt (1994)	1992	Y	N	N	Y	Y	N	Y	N	N	N	Y	Y	N	Y
Fitzpatrick															
Anderson and Manfredo (1986)	1978	Y	N	N	Y	N	N	Y	Y	N	N	N	Y	N	N
Manfredo (1979)	1978	Y	N	N	Y	N	N	Y	Y	N	N	N	Y	N	Y
Flat Tops															
Nellis (1996)	1995	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Johnson and others (1997)	1996	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	N
Fort Niobrara															
Davis and Lindvall (2000)	1998	N	Y	N	Y	N	N	N	N	Y	N	Y	Y	N	N
Frank Church-River of No Return	1996	Y	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y
Cole and McCool (1997)	1995	N	Y	N	Y	N	N	N	N	Y	N	N	Y	N	Y
Hunger (1996)	1995	N	Y	N	Y	N	N	N	N	Y	N	N	Y	N	Y
Hunger and others (1999)	1995	N	Y	N	Y	N	N	N	N	Y	N	N	Y	N	Y
Watson and others (1998b)	1995	N	Y	N	Y	N	N	N	N	Y	N	N	Y	N	Y
Garden of the Gods	1991	Y	N	N	N	N	N	N	N	N	N	N	N	N	N

Appendix D (continued)

Wilderness	Earliest date	All	Portion	Opportunistic	Main season	Off season	Different seasons	Hikers	Stock users	Water users	Different travel modes	Day users	Overnight users	Different length of stay	General characteristics
Gila															
Wildland Res. Center (1962)	1960	N	N	Y	Y	N	N	Y	Y	N	N	N	Y	N	Y
Glacier Bay	1996	N	N	N	Y	N	N	Y	N	Y	N	Y	Y	N	Y
Johnson (1978)	1978	N	Y	N	Y	N	N	Y	N	N	N	N	Y	N	Y
Womble and others (1980)	1978	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Johnson (1985)	1984	N	N	Y	Y	N	Y	N	N	Y	N	N	Y	N	Y
Salvi and Johnson (1985)	1984	Y	N	N	Y	N	N	Y	N	Y	Y	N	Y	N	Y
Glacier Peak	1993	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Hendee and others (1968)	1965	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Butterworth (1970)	1968	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	N
Granite Mountain	1998	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Great Bear															
Lucas (1980)	1970	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Lucas(1985)	1970	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Great Gulf	1999	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	Y
Hill and others (2000)	1996	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	N
Canon and others (1979)	Unk	N	Y	N	Y	N	N	Y	N	N	N	N	Y	N	N
Great Sand Dunes	1997	N	N	Y	Y	Y	N	Y	N	N	N	Y	Y	N	Y
Haleakala															
Anderson and others (1993)	1992	N	Y	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Hawaii Volcanoes															
Anderson and others (1993)	1992	N	Y	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Headwaters	1985	N	N	Y	Y	N	N	Y	N	N	N	Y	Y	N	Y
Hells Canyon	1995	Y	N	N	Y	N	N	Y	Y	N	Y	Y	Y	N	Y
Henry M. Jackson	1993	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Hercules-Glades	1998	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Hickory Creek	1996	Y	N	N	Y	N	N	Y	Y	N	Y	Y	Y	Y	Y
Graefe and others (2000)	1997	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	Y	Y
High Uintas	1995	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Stankey (1973)	1969	Y	N	N	Y	N	N	Y	Y	N	Y	Y	Y	N	Y
Kennedy and Brown (1976)	1972	N	Y	N	Y	N	N	Y	Y	N	Y	Y	Y	N	Y
Johnson and others (1997)	1996	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	N
Hoss and Brunson (2000)	Unk	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y	N	N
Holy Cross	Unk	Y	N	N	N	N	N	N	N	N	N	N	N	N	Y
Hunter-Fryingpan	Unk	Y	N	N	N	N	N	N	N	N	N	N	N	N	Y
Indian Peaks	Unk	N	N	Y	N	N	N	N	N	N	N	Y	Y	N	Y
Anderson (1981)	1980	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Irish	1998	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Isle Royale															
Pierskalla and others (1997)	1996	Y	N	N	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y
Pierskalla and others (2000)	1997	Y	N	N	Y	N	N	Y	N	Y	N	Y	Y	N	N
Cain and Buckley (1964)	Unk				N	N	N	N	N	N	N	N	N	N	N
Jedediah Smith															
Blahna and others (1995)	1993	N	Y	N	Y	N	N	Y	Y	N	Y	Y	Y	N	N
Blahna and Archibald (1997)	1997	N	Y	N	Y	N	N	Y	Y	N	Y	Y	Y	N	N
John Muir	1974	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	Y	Y
Watson and Niccolucci (1992a)	1989	Y	N	N	Y	N	N	Y	N	N	N	N	Y	N	N
Ewert and Hood (1995)	1990	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Watson and others (1993)	1990	Y	N	N	Y	N	N	Y	Y	N	Y	N	Y	N	N
Watson and others (1994)	1990	Y	N	N	Y	N	N	Y	Y	N	Y	N	Y	N	N

Appendix D (continued)

Wilderness	Earliest date	All	Portion	Opportunistic	Main season	Off season	Different seasons	Hikers	Stock users	Water users	Different travel modes	Day users	Overnight users	Different length of stay	General characteristics
Wildland Res. Center (1962)	1990	N	N	Y	Y	N	N	Y	Y	N	N	N	Y	N	Y
Christensen and Cole (2000)	1993	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	N
Joshua Tree															
Trench and Wallace (1994)	1960	Y	N	N	Y	Y	N	Y	N	N	Y	N	N	N	N
Joyce Kilmer-Slickrock															
Roggenbuck & Dawson (1979)	1978	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	Y	Y
Roggenbuck and others (1979)	1978	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Roggenbuck and others (1982)	1978				Y	N	N	Y	Y	N	N	Y	Y	N	Y
Roggenbuck (1980)	1993	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	Y	N
Juniper Prairie															
Borrie and Roggenbuck (1998)	1978	Y	N	N	Y	N	N	N	N	Y	N	Y	N	N	N
Katmai															
Womble and others (1980)	1978	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Womble (1981)	1994	Y	N	N	Y	N	N	Y	N	N	N	N	Y	N	Y
Kenai															
Vande Kamp and others (2002)	1978	N	Y	N	Y	N	N	Y	N	N	N	Y	Y	N	Y
Lassen Volcanic	1999	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	Y
Lee Metcalf	1981	N	N	N	Y	N	N	Y	N	Y	Y	Y	Y	N	Y
McCool and others (1990)	1970	N	Y	N	Y	N	N	Y	N	Y	Y	Y	Y	N	Y
Stankey (1980)	1989	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Lucas (1980)	2001	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Lewis Fork															
Ramthun and others (2000)	1972	N	Y	N	Y	Y	N	Y	Y	N	N	Y	Y	N	N
Widner (1994)	1992	Y	N	N	Y	Y	N	Y	Y	N	Y	Y	Y	N	Y
Roggenbuck and others (1994)	1995	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Linville Gorge	1998	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	Y	Y
Roggenbuck & Dawson (1979)	1978	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	Y	Y
Roggenbuck and others (1979)	1978	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Roggenbuck and others (1982)	1978	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Roggenbuck (1980)	1992	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	Y	N
Little Dry Run															
Ramthun and others (2000)	1995	N	Y	N	N	Y	N	Y	Y	N	N	Y	Y	N	N
Little Lake Creek	1997	Y	N	N	Y	Y	N	Y	N	N	N	N	N	N	Y
Little Wilson Creek															
Roggenbuck and others (1994)	1992	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Widner (1994)	1992	Y	N	N	Y	Y	N	Y	Y	N	Y	Y	Y	N	Y
Ramthun and others (2000)	1995	N	Y	N	N	Y	N	Y	Y	N	N	Y	Y	N	N
Lone Peak															
Hoss and Brunson (2000)	Unk	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y	N	N
Lusk Creek	1991	Y	N	N	N	N	N	N	N	N	N	N	N	N	N
Marjory Stoneman Douglas															
Stewart (1991)	1989	Y	N	N	Y	N	N	N	N	Y	N	Y	Y	Y	N
Maroon Bells-Snowmass	Unk	Y	N	N	N	N	N	N	N	N	N	N	N	N	Y
Allen (1979)	1978	Y	N	N	Y	N	N	N	N	N	N	N	N	N	Y
Haas and others (1982)	1980	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Mecca Hills															
Chavez and others (1993)	1991	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Mission Mountains															
Merriam and Ammons (1968)	1964	N	N	Y	Y	N	N	Y	N	N	N	Y	Y	N	Y

Appendix D (continued)

Wilderness	Earliest date	All	Portion	Opportunistic	Main season	Off season	Different seasons	Hikers	Stock users	Water users	Different travel modes	Day users	Overnight users	Different length of stay	General characteristics
Wright (1966)	1964	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Lucas (1980)	1970	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Flood (1999)	1998	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	N
Flood and McAvoy (2000)	1998	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Mollie Beattie															
Warren (1980, 1986)	1977	Y	N	N	Y	N	N	Y	N	N	Y	N	Y	N	Y
Mount Baker	1990	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Mount Baldy															
Hoover and others (1985)	Unk	N	Y	N	Y	N	N	Y	N	N	N	N	N	N	Y
Mount Jefferson	Unk	N	N	N	Y	N	N	Y	N	N	N	Y	Y	N	Y
Shelby and Harris (1986)	1983	N	Y	N	Y	N	N	Y	N	N	N	N	Y	N	N
Shelby and Harris (1985)	1984	N	Y	N	Y	N	N	N	N	N	N	N	Y	N	N
Shelby and others (1988)	1985	N	Y	N	Y	N	N	Y	Y	N	N	N	Y	N	N
Christensen and Cole (2000)	1991	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	N
Cole and others (1997)	1991	N	Y	N	Y	N	N	Y	N	N	N	Y	Y	Y	Y
Cronn and others (1992)	1991	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	Y	Y
Dawson and Watson (2000)	1991	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Hall and Cole (2000)	1991	N	Y	N	Y	N	N	Y	Y	Y	N	Y	Y	N	Y
Mount Naomi															
Brunner (1993)	1993	Y	N	N	Y	Y	N	Y	Y	N	Y	Y	Y	N	Y
Mount Olympus															
Hoss and Brunson (2000)	Unk	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y	N	N
Mount Rainier															
Ewert (1986)	1983	N	Y	N	Y	N	N	Y	N	N	N	N	Y	N	N
Vande Kamp and others (1998)	1993	N	Y	N	Y	N	N	Y	N	N	N	Y	Y	N	Y
Swanson and others (2002)	1995	Y	N	N	Y	N	N	Y	N	N	N	N	Y	N	Y
VandeKamp and others (2000)	1995	N	Y	N	Y	N	N	Y	N	N	N	Y	N	N	Y
Lah (2000)	1997	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	N
Mount Timpanogos															
Hoss and Brunson (2000)	Unk	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y	N	N
Mount Washington															
Robertson (1986)	1984	N	Y	N	Y	N	N	Y	Y	N	N	N	Y	N	N
Christensen and Cole (2000)	1991	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	N
Cronn and others (1992)	1991	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	Y	Y
Dawson and Watson (2000)	1991	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Mountain Lakes															
Wenger (1964)	1961	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	N
Wenger and Gregersen (1964)	1961	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	N
Burch and Wenger (1967)	1962	Y	N	N	Y	N	N	Y	N	N	N	N	Y	N	N
Mt. Shasta															
Puttkammer (1994)	1993	N	Y	N	Y	N	N	Y	N	N	N	N	Y	N	Y
Munds Mountain	1995	N	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Behan and others (2000)	1996	N	N	Y	Y	Y	N	Y	N	N	N	Y	N	N	Y
Noisy-Diobsud	1993	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Nordhouse Dunes	1994	Y	N	N	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y
Norse Peak	1993	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Okefenokee															
Shafer (1993)	1992	Y	N	N	Y	Y	N	N	N	Y	N	N	Y	N	Y
Shafer and Hammitt (1995)	1992	Y	N	N	Y	N	N	Y	N	Y	N	Y	Y	N	N
Borrie (1995)	1994	Y	N	N	Y	N	N	N	N	Y	N	Y	Y	N	N

Appendix D (continued)

Wilderness	Earliest date	All	Portion	Opportunistic	Main season	Off season	Different seasons	Hikers	Stock users	Water users	Different travel modes	Day users	Overnight users	Different length of stay	General characteristics
Hockett and others (2002)	1999	Y	N	N	Y	N	N	N	N	Y	Y	Y	Y	Y	Y
Olympic	1998	Y	N	N	Y	N	N	Y	Y	N	N	N	Y	N	Y
Sommarstrom (1966)	1964	Y	N	N	Y	N	N	Y	N	N	N	N	Y	N	Y
Flewelling and Johnson (1982)	1980	N	Y	N	Y	N	N	Y	N	N	N	N	Y	N	N
Boag (1985)	1983	N	Y	N	Y	N	N	Y	N	N	N	N	Y	N	N
Otter Creek	1990	N	N	Y	Y	N	N	Y	N	N	N	Y	Y	N	Y
Paddy Creek	1998	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Panther Den	1991	Y	N	N	N	N	N	N	N	N	N	N	N	N	N
Paria Canyon-Vermilion Cliffs	1993	N	N	N	Y	Y	N	Y	N	N	N	Y	Y	N	Y
Snyder and others (1995)	1993	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Olsen (1998, 1999)	1997	N	Y	N	Y	Y	N	Y	N	N	N	Y	Y	N	N
Hoss and Brunson (2000)	Unk	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y	N	N
Pecos															
Thorn (1994)	1992	Y	N	N	Y	N	N	Y	N	N	N	N	Y	N	N
Pemigewasset	1996	N	N	Y	Y	N	N	Y	N	N	N	Y	Y	N	Y
Fedler and Kuss (1986)	1984	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Pine Valley Mountain	1994	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Snyder and others (1995)	1993	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Piney Creek	1998	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Popo Agie															
Anderson and Manfredo (1986)	1978	Y	N	N	Y	N	N	Y	Y	N	N	N	Y	N	N
Manfredo (1979)	1978	Y	N	N	Y	N	N	Y	Y	N	N	N	Y	N	Y
Porcupine Lake	1985	N	N	N	Y	N	N	Y	N	N	N	Y	Y	N	Y
Raggeds	1997	Y	N	N	Y	N	N	Y	Y	N	N	N	Y	N	Y
Ramseys Draft															
Gentile and others (1991)	1991	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	Y
Rattlesnake															
Kelley (1979)	1978	Y	N	N	Y	N	N	Y	Y	N	Y	Y	Y	N	Y
Roggenbuck and others (1993)	1990	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Williams and others (1992a,b)	1990	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Rawah															
Badger (1975)	1974	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Bultena and others (1981)	1975	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Haas (1979)	1977	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Harris (1978)	1977	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	Y
Red Buttes	1997	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	N
Red Rock-Secret Mountain	1995	N	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Behan and others (2000)	1996	N	N	Y	Y	Y	N	Y	N	N	N	Y	N	N	Y
Rockpile Mountain	1998	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Rogue-Umpqua Divide	Unk	N	N	Y	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Saguaro	1999	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	Y
Sheehan (1989)	1989	N	Y	N	N	N	N	Y	Y	N	Y	Y	N	N	N
Saint Mary's															
Gentile and others (1990)	1990	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	Y
Gentile and others (1991)	1991	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	Y
San Gabriel															
Parker and Winter (1998)	1995	Y	N	N	Y	N	N	Y	N	N	N	Y	N	N	Y
San Gorgonio															
Stankey (1979)	1973	Y	N	N	Y	Y	N	N	N	N	N	N	Y	N	N
Ewert and Hood (1995)	1989	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y

Appendix D (continued)

Wilderness	Earliest date	All	Portion	Opportunistic	Main season	Off season	Different seasons	Hikers	Stock users	Water users	Different travel modes	Day users	Overnight users	Different length of stay	General characteristics
Winter (1996)	1994	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Winter and others (1997)	1997	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Winter and others (1999)	1998	N	Y	N	Y	N	N	Y	N	N	N	Y	Y	N	Y
San Jacinto															
Stankey (1979)	1973	Y	N	N	Y	Y	N	N	N	N	N	N	Y	N	N
Setran (1978)	1976	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	Y
San Mateo Canyon															
Chavez (1994)	1993	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Sandia Mountain	1991	N	N	Y	Y	Y	N	Y	N	N	N	Y	N	N	Y
Sandwich Range															
Berry and others (1993)	1991	N	Y	N	Y	N	N	Y	N	N	N	N	N	N	Y
Sangre de Cristo	1995	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Sawtooth															
Boyd (1995)	1994	N	Y	N	Y	N	N	Y	Y	N	N	N	Y	N	N
Scapegoat	Unk	N	N	Y	Y	N	N	Y	Y	N	N	N	Y	N	Y
Lucas (1980)	1970	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Lucas(1985)	1970	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Selway-Bitterroot	1993	N	N	N	Y	N	N	Y	Y	N	Y	Y	Y	N	Y
Lucas (1980)	1971	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
McCool and Stankey (1986)	1971	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	N
Stoner (1976)	1971	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Fazio (1979)	1976	Y	N	N	Y	N	N	Y	Y	N	Y	Y	Y	Y	Y
Hammond (1994)	1993	N	Y	N	Y	N	N	Y	Y	N	Y	Y	Y	N	N
McCool and Cole (2000)	1995	N	Y	N	Y	N	N	Y	Y	N	Y	Y	Y	Y	Y
Sequoia-Kings Canyon															
Cooke (1971)	1971	N	N	Y	N	N	N	N	N	N	N	N	N	N	N
Kantola (1976)	1976	Y	N	N	Y	N	N	Y	N	N	N	N	Y	N	Y
Scuderi (1981)	1979	N	Y	N	Y	N	N	Y	N	N	N	N	Y	N	N
Zuckert (1980)	1979	N	Y	N	Y	N	N	Y	N	N	N	N	Y	N	Y
Watson and others (1993)	1990	Y	N	N	Y	N	N	Y	Y	N	Y	N	Y	N	Y
Sheep Mountain															
Parker and Winter (1998)	1995	Y	N	N	Y	N	N	Y	N	N	N	Y	N	N	Y
Shenandoah															
Roggenbuck (1980)	1978	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	Y	N
Roggenbuck & Dawson (1979)	1978	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	Y	Y
Kiely-Brocato (1980)	1980	N	N	Y	N	N	N	N	N	N	N	N	N	N	N
Wellman and others (1982)	1980	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Hockett and Hall (1999)	1997	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	Y	Y
Hockett and Hall (2000)	1998	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Papenfuse and others (2000)	1998	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	Y	Y
Shining Rock															
Cole and others (1995)	1978	Y	N	N	N	N	N	Y	N	N	N	Y	Y	N	Y
Roggenbuck (1980)	1978	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	Y	N
Roggenbuck & Dawson (1979)	1978	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	Y	Y
Roggenbuck and Stubbs (1991)	1978	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Roggenbuck and others (1979)	1978	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Roggenbuck and others (1982)	1978	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Roggenbuck & Berrier (1980)	1979	N	Y	N	Y	N	N	Y	N	N	Y	N	Y	N	N
Christensen and Cole (2000)	1990	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	N
Stubbs (1991)	1990	Y	N	N	Y	N	N	Y	N	N	N	N	Y	N	N

Appendix D (continued)

Wilderness	Earliest date	All	Portion	Opportunistic	Main season	Off season	Different seasons	Hikers	Stock users	Water users	Different travel modes	Day users	Overnight users	Different length of stay	General characteristics
Stubbs & Roggenbuck (1994)	1990	Y	N	N	Y	N	N	Y	N	N	N	N	Y	N	N
Schuster (2000)	1999	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	Y
Sipsey															
Clonts (1994)	1991	Y	N	N	Y	Y	N	Y	Y	N	N	Y	Y	N	Y
Clonts and others (1998)	1992	Y	N	N	Y	N	N	Y	N	Y	Y	Y	Y	N	Y
Superstition	1999	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Lewis (1971)	1970	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Schneider and others (2000)	1997	N	Y	N	Y	Y	N	Y	Y	N	N	Y	Y	N	N
Schneider (2000)	1998	N	Y	N	Y	N	N	Y	N	N	N	Y	Y	N	Y
Teton	1989	Y	N	N	Y	N	N	Y	Y	N	Y	Y	Y	Y	Y
Three Sisters															
Wenger (1964)	1961	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	N
Wenger and Gregersen (1964)	1961	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	N
Burch and Wenger (1967)	1962	Y	N	N	Y	N	N	Y	N	N	N	N	Y	N	N
Hendee and others (1968)	1965	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Robertson (1981)	1980	N	N	Y	Y	N	N	Y	Y	N	Y	N	Y	N	Y
Robertson (1986)	1984	N	Y	N	Y	N	N	Y	Y	N	N	N	Y	N	N
Christensen and Cole (2000)	1991	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	N
Cole and others (1997)	1991	N	Y	N	Y	N	N	Y	N	N	N	Y	Y	Y	Y
Cronn and others (1992)	1991	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	Y	Y
Dawson and Watson (2000)	1991	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Hall and Cole (2000)	1991	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Twin Peaks															
Hoss and Brunson (2000)	Unk	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y	N	N
Uncompahgre															
Johnson and others (1997)	1996	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	N
Upland Island	Unk	Y	N	N	N	Y	N	Y	Y	N	N	Y	Y	N	Y
Watson and others (1992)	1989	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Roggenbuck and others (1993)	1990	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Williams and others (1992a,b)	1990	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	N
Upper Kiamichi River															
Kuzmic (1993)	1991	Y	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Weminuche															
Haas (1979)	1977	Y	N	N	Y	N	N	Y	Y	N	N	Y	Y	N	Y
Johnson and others (1997)	1996	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	N
West Elk	1997	Y	N	N	Y	N	N	Y	Y	N	N	N	Y	N	Y
Johnson and others (1997)	1996	N	Y	N	Y	N	N	Y	Y	N	N	Y	Y	N	N
Whisker Lake	1985	N	N	Y	Y	N	N	Y	N	N	N	Y	Y	N	Y
Yosemite															
Lee (1975)	1973	N	Y	N	Y	N	N	Y	N	N	N	N	Y	N	Y
Lee (1977)	1973	N	Y	N	Y	N	N	Y	N	N	N	N	Y	N	N
Absher and Lee (1981)	1976	N	Y	N	Y	N	N	Y	N	N	N	N	Y	N	N
Absher and Lee (1978)	1977	Y	N	N	Y	N	N	Y	N	N	N	Y	Y	N	Y

Appendix E: References for published campsite, trail, and visitor studies.

- Absher, J. 1979. A sociological approach to crowding in outdoor recreation: a study of the Yosemite National Park backcountry. Berkeley: University of California, Berkeley. Dissertation.
- Absher, J. D.; Lee, Robert G. 1978. Analysis of sociological carrying capacity for the Yosemite National Park backcountry: final research report. Unpublished report on file at: Berkeley: University of California, Berkeley, Department of Forestry and Conservation. 57 p.
- Absher, James D.; Lee, Robert G. 1981. Density as an incomplete cause of crowding in backcountry settings. *Leisure Sciences*. 4(3): 231–247.
- Adelman, Bonnie J.; Heberlein, T. A.; Bonnicksen, T. M. 1982. Social psychological explanations for the persistence of a conflict between paddling canoeists and motorcraft users in the Boundary Waters Canoe Area. *Leisure Sciences*. 5: 45–62.
- Allen, Deborah J. 1979. Wilderness user preferences for psychological outcomes and setting attributes. Fort Collins: Colorado State University. 123 p. Dissertation.
- Anderson, Dorothy H. 1980. Displacement of visitors within the Boundary Waters Canoe Area Wilderness. Fort Collins: Colorado State University. 138 p. Dissertation.
- Anderson, Dorothy H.; Brown, Perry J. 1984. The displacement process in recreation. *Journal of Leisure Research*. 16: 61–73.
- Anderson, Dorothy H.; Manfredo, Michael J. 1986. Visitor preferences for management actions. In: Lucas, Robert C., comp. Proceedings—national wilderness research conference: current research; 1985 July 23–26; Fort Collins, CO. Gen. Tech. Rep. INT-212. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station: 314–319.
- Anderson, G.; Horonjeff, R.; Menge, C.; Miller, R.; Robert, W.; Rossano, C.; Sanchez, G.; Baumgartner, R.; McDonald, C. 1993. Dose-response relationships derived from data collected at Grand Canyon, Haleakala and Hawaii Volcanoes National Parks. NPOA Rep. 93–6/NPOA Rep. 290940.14. Lesington, MA: Harris Miller Miller & Hanson Inc.
- Anderson, Marcia J. 1981. User perception of human impact in the backcountry: a comparative study. Laramie: University of Wyoming. 115 p. Thesis.
- Badger, Thomas J. 1975. Rawah Wilderness crowding tolerances and some management techniques: an aspect of social carrying capacity. Fort Collins: Colorado State University. 83 p. Thesis.
- Behan, Jeffrey R.; Richards, Merton T.; Lee, Martha E. 2000. How do visitor density and anthropogenic change in frontcountry wilderness settings affect recreation benefits? In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. Wilderness science in a time of change conference—Volume 4: wilderness visitors, experiences, and visitor management; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-4. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 63–68.
- Berry, Judith; Hals, Hansi; Schriever, James; Auchly, Bruce. 1993. Hiker characteristics as an indicator of perceived congestion in the Sandwich Range Wilderness area. In: Vander Stoep, Gail A., ed. Proceedings of the 1992 Northeastern recreation research symposium; 1992 April 5–7; Saratoga Springs, NY. Gen. Tech. Rep. NE-176. Radnor, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station: 51–54.
- Blahna, Dale J.; Archibald, Kari S. 1997. Backcountry llama packing: what do other wilderness visitors think? *Yellowstone Science*. 5: 9–12.
- Blahna, Dale J.; Smith, Kari S.; Anderson, Janet A. 1995. Backcountry llama packing: visitor perceptions of acceptability and conflict. *Leisure Sciences*. 17(3): 185–204.
- Boag, Alistair James. 1985. The effect of sequencing information during and after the planning and preparation phase of the outdoor recreation experience on recreationists' expectations, learning, and satisfaction. Seattle: University of Washington. 238 p. Dissertation.
- Borrie, William T. 1995. Measuring the multiple, deep, and unfolding aspects of the wilderness experience using the Experience Sampling Method. Blacksburg: Virginia Polytechnic Institute and State University. 263 p. Dissertation.
- Borrie, William T.; Roggenbuck, Joseph W. 1998. Describing the wilderness experience at Juniper Prairie Wilderness using experience sampling methods. In: Kulhavy, David L.; Legg, Michael H., eds. Wilderness & natural areas in Eastern North America: research, management and planning. Nacogdoches, TX: Stephen F. Austin State University, Arthur Temple College of Forestry, Center for Applied Studies: 165–172.
- Boyd, Andrew W. 1995. The effectiveness of belief-based communications on low impact camping behavior in the Sawtooth Wilderness. Moscow: University of Idaho. 126 p. Thesis.
- Boyers, Laurel; Fincher, Mark; van Wagtendonk, Jan. 2000. Twenty-eight years of wilderness campsite monitoring in Yosemite National Park. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. Wilderness science in a time of change conference—Volume 5: wilderness ecosystems, threats, and management; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-5. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 105–109.
- Bradt, William C. 1965. A survey of the users of the Bob Marshall Wilderness Area, Montana, in 1964. Bozeman: Montana State University. 132 p. Thesis.
- Brown, Perry J.; Haas, Glenn E. 1980. Wilderness recreation experiences: the Rawah case. *Journal of Leisure Research*. 12(3): 229–241.
- Brown, Perry J.; Schomaker, John H. 1974. Final report on criteria for potential wilderness campsites. Supplement no. 323 to 12-11-204-3. Logan, UT: Institute for Study of Outdoor Recreation and Tourism. 50 p.
- Brunner, Jerry. 1993. Mt. Naomi Wilderness survey. Unpublished report on file at: Logan, UT: U.S. Department of Agriculture, Forest Service, Intermountain Region, Logan Ranger District.
- Bultena, Gordon; Albrecht, Don; Womble, Peter. 1981a. Freedom versus control: a study of backpackers' preferences for wilderness management. *Leisure Sciences*. 4(3): 297–310.
- Bultena, Gordon; Field, Donald; Womble, Peter; Albrecht, Don. 1981b. Closing the gates: a study of backcountry use-limitation at Mount McKinley National Park. *Leisure Sciences*. 4(3): 249–267.
- Bultena, Gordon L.; Taves, Marvin. 1961. Changing wilderness images and forestry policy. *Journal of Forestry*. 59: 167–171.
- Burch, William R., Jr.; Wenger, Wiley D., Jr. 1967. The social characteristics of participants in three styles of family camping. Res. Pap. PNW-48. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station. 30 p.
- Butterworth, Stephen Ernest. 1970. Development of model guidebooks for Glacier Peak Wilderness. Seattle: University of Washington. 70 p. Thesis.
- Cain, S. A.; Buckley, M. A. 1964. The motivations and satisfactions of visitors to Isle Royale National Park, Michigan. Report to the Governor's Interdepartmental Resources Development Committee, State of Michigan.
- Canon, Lance K.; Adler, Steven; Leonard, Raymond E. 1979. Factors affecting dispersion of backcountry campsites. Res. Note NE-276. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 6 p.
- Carlisle, Cynthia. 1992. Big Frog Wilderness visitor study. Clemson, SC: Clemson University, Department of PRTM. 43 p.
- Carpenter, M. Ralph; Bowlus, Donald R. 1976. Attitudes toward fishing and fisheries management of users in Desolation Wilderness, California. *California Fish and Game*. 62 (3): 168–178.
- Chappell, Robert L., Jr. 1999. Course assignments, spring semester 1999. Unpublished paper on file at: Athens: University of Georgia, Warnell School of Forest Resources.
- Chavez, Deborah J. 1994. Pilot study of changing urban wilderness recreation use on the Cleveland National Forest. Unpublished paper on file at: Riverside, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station.
- Chavez, Deborah; Baas, John; Winter, Patricia. 1993. Mecca Hills: visitor research case study. BLM/CA/ST-93-005-9560. Sacramento, CA: U.S. Department of the Interior, Bureau of Land Management. 27 p.

- Christensen, Neal A.; Cole, David N. 2000. Leave No Trace practices: behaviors and preferences of wilderness visitors regarding use of cookstoves and camping away from lakes. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. 2000. Wilderness science in a time of change conference—Volume 4: wilderness visitors, experiences, and visitor management; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-4. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 77–85.
- Clonts, Howard A. 1994. Visitor characteristics, preferences and wilderness conditions, Cheaha and Sipsey Wilderness Areas: monitoring for limits of acceptable change. Unpublished paper on file at: Auburn, AL: Auburn University, Alabama Agricultural Experiment Station, Department of Agricultural Economics and Rural Sociology. 118 p.
- Clonts, Howard A.; Malone, Joy W.; Acharya, Ram N. 1998. Preferences for solitude in wild places. In: Kulhavy, David L.; Legg, Michael H., eds. Wilderness & natural areas in Eastern North America: research, management, and planning. Nacogdoches, TX: Stephen F. Austin State University, Arthur Temple College of Forestry, Center for Applied Studies in Forestry: 205–210.
- Cole, David N. 1977. Man's impact on wilderness vegetation: an example from Eagle Cap Wilderness, northeastern Oregon. Eugene: University of Oregon. 307 p. Dissertation.
- Cole, David N. 1982a. Wilderness campsite impacts: effect of amount of use. Res. Pap. INT-284. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 34 p.
- Cole, David N. 1982b. Campsite standards and monitoring in the Bob Marshall Wilderness. Unpublished report on file at: U.S. Department of Agriculture, Forest Service, Aldo Leopold Wilderness Research Institute, Missoula, MT.
- Cole, David N. 1982c. Controlling the spread of campsites at popular wilderness destinations. *Journal of Soil and Water Conservation*. 37(5): 291–295.
- Cole, David N. 1983a. Campsite conditions in the Bob Marshall Wilderness, Montana. Res. Pap. INT-312. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 18 p.
- Cole, David N. 1983b. Assessing and monitoring backcountry trail conditions. Res. Pap. INT-303. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 10 p.
- Cole, David N. 1984. An inventory of campsites in the Flathead National Forest portion of the Bob Marshall Wilderness. Unpublished report on file at: U.S. Department of Agriculture, Forest Service, Aldo Leopold Wilderness Research Institute, Missoula, MT.
- Cole, David N. 1986a. Recreational impacts on backcountry campsites in Grand Canyon National Park, Arizona, USA. *Environmental Management*. 10(5): 651–659.
- Cole, David N. 1986b. Ecological changes on campsites in the Eagle Cap Wilderness, 1979 to 1984. Res. Pap. INT-368. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 15 p.
- Cole, David N. 1991. Changes on trails in the Selway-Bitterroot Wilderness, Montana, 1978–1989. Res. Pap. INT-450. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 5 p.
- Cole, David N. 1993. Campsites in three Western wildernesses: proliferation and changes in condition over 12 to 16 years. Res. Pap. INT-463. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 15 p.
- Cole, David N.; Fichtler, Richard K. 1983. Campsite impact on three Western wilderness areas. *Environmental Management*. 7(3): 275–288.
- Cole, David N.; Hall, Troy E. 1992. Trends in campsite condition: Eagle Cap Wilderness, Bob Marshall Wilderness, and Grand Canyon National Park. Res. Pap. INT-453. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 40 p.
- Cole, David N.; Marion, Jeffrey L. 1986. Wilderness campsite impacts: changes over time. In: Lucas, Robert C., comp. Proceedings—national wilderness research conference: current research; 1985 July 23–26; Fort Collins, CO. Gen. Tech. Rep. INT-212. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station: 144–151.
- Cole, David N.; McCool, Stephen F. 1997. Limits of Acceptable Change and natural resources planning: when is LAC useful, when is it not? In: McCool, Stephen F.; Cole, David N., comps. Proceedings—Limits of Acceptable Change and related planning processes: progress and future directions; 1997 May 20–22; Missoula, MT. Gen. Tech. Rep. INT-GTR-371. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 69–71.
- Cole, David N.; Ranz, Beth. 1983. Temporary campsite closures in the Selway-Bitterroot Wilderness. *Journal of Forestry*. 81(11): 729–732.
- Cole, David N.; Spildie, David R. 2000. Soil amendments and planting techniques: campsite restoration in the Eagle Cap Wilderness, Oregon. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. Wilderness science in a time of change conference—Volume 5: wilderness ecosystems, threats, and management; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-5. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 199–208.
- 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. Res. Pap. INT-RP-496. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 30 p.
- Cole, David N.; Watson, Alan E.; Roggenbuck, Joseph W. 1995. Trends in wilderness visitors and visits: Boundary Waters Canoe Area, Shining Rock, and Desolation Wildernesses. Res. Pap. INT-RP-483. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station.
- Cooke, Douglas Bryan. 1971. The perceived environment of wilderness in Kings Canyon National Park. Cincinnati, OH: University of Cincinnati. 79 p. Thesis.
- Coombs, Elizabeth A.K. 1976. The impact of camping on vegetation in the Bighorn Crags, Idaho primitive area. Moscow: University of Idaho. 63 p. Thesis.
- Cronn, Richard; Watson, Alan E.; Cole, David N. 1992. Three Sisters, Mt. Jefferson, and Mt. Washington Wildernesses, 1991: a survey of Oregon wilderness visitors. Unpublished report on file at: U.S. Department of Agriculture, Forest Service, Intermountain Research Station, Missoula, MT. 94 p.
- Dale, Donn R. 1973. Effects of trail-use under forests in the Madison Range, Montana. Bozeman: Montana State University. 96 p. Thesis.
- Davis, John B.; Lindvall, Mark. 2000. Standards of quality for river use within the Fort Niobrara Wilderness Area. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. Wilderness science in a time of change conference—Volume 4: wilderness visitors, experiences, and visitor management; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-4. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 232–235.
- Dawson, Chad P.; Watson, Alan E. 2000. Measures of wilderness trip satisfaction and user perceptions of crowding. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. Wilderness science in a time of change conference—Volume 4: wilderness visitors, experiences, and visitor management; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-4. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 93–98.
- Ditton, Robert B. 1979. The Buffalo National River recreation study: year one. Unpublished report on file at: Texas A&M University, Texas Agricultural Experiment Station, Department of Recreation and Parks, College Station, TX. 115 p.
- Ditton, Robert B. 1981. The Buffalo National River recreation study: year two. Unpublished report on file at: Texas A&M University, Texas Agricultural Experiment Station, Department of Recreation and Parks, College Station, TX. 192 p.
- Ditton, Robert B.; Graefe, Alan R.; Fedler, Anthony J. 1981. Recreational satisfaction at Buffalo National River: some measurement concerns. In: Some recent research products of river recreation research. Gen. Tech. Rep. NC-63. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station: 9–17.

- Dunwiddie, Peter; Heberlein, Thomas A. 1976. Crowding and campsite selection at a high mountain lake. Unpublished report on file at: University of Wisconsin, Madison.
- Dykema, Jean A. 1971. Ecological impact of camping upon the Southern Sierra Nevada. Los Angeles: University of California, Los Angeles. 156 p. Dissertation.
- Eagan, Sean; Newman, Peter. 1999. Plant community re-establishment in former high-elevation campsites in Yosemite National Park. In: Harmon, David, ed. On the frontiers of conservation: proceedings of the 10th conference on research and resource management in parks on public lands; Asheville, N.C. Hancock, MI: The George Wright Society: 239–244.
- Eagan, Sean; Newman, Peter; Fritzke, Susan; Johnson, Louise. 2000. Restoration of multiple-rut trails in the Tuolumne Meadows of Yosemite National Park. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. Wilderness science in a time of change conference—Volume 5: wilderness ecosystems, threats, and management; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-5. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 188–192.
- Echelberger, Herbert E.; Moeller, George H. 1977. Use and users of the Cranberry backcountry in West Virginia: insights for Eastern backcountry management. Res. Pap. NE-363. Upper Darby, PA: Northeastern Forest Experiment Station. 8 p.
- Ewert, Alan. 1986. Motivation, skills levels, and their relationship in mountaineering. In: Lucas, Robert C., comp. Proceedings—national wilderness research conference: current research; 1985 July 23–26; Fort Collins, CO. Gen. Tech. Rep. INT-212. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station: 354–361.
- Ewert, Alan. 1993. Differences in the level of motive importance based on trip outcome, experience level, and group type. *Journal of Leisure Research*. 25(4): 335–349.
- Ewert, Alan W.; Hood, David. 1995. Urban-proximate and urban-distant wilderness: an exploratory comparison between two “types” of wilderness. *Journal of Park and Recreation Administration*. 13 (2): 73–85.
- Farrell, Tracy A.; Marion, Jeffrey L. 1998. An evaluation of camping impacts and their management at Isle Royale National Park. Unpublished report on file at: Houghton, MI: U.S. Department of the Interior, National Park Service, Isle Royale National Park. 97 p.
- Farrell, Tracy A.; Marion, Jeffrey L. 2000. Camping impact management at Isle Royale National Park: an evaluation of visitor activity containment policies from the perspective of social conditions. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. Wilderness science in a time of change conference—Volume 5: wilderness ecosystems, threats, and management; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-5. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 110–114.
- Fazio, James R. 1979. Communicating with the wilderness user. Moscow: University of Idaho, College of Forestry, Wildlife and Range Sciences. Bulletin No. 28: 5–22.
- Fedler, Anthony J.; Kuss, Fred R. 1986. An examination of the effects of wilderness designation on hiker attitudes. In: Lucas, Robert C., comp. Proceedings—national wilderness research conference: current research; 1985 July 23–26; Fort Collins, CO. Gen. Tech. Rep. INT-212. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station: 308–313.
- Fichtler, Richard K. 1980. The relationship of recreational impacts on backcountry campsites to selected Montana habitat types. Missoula: University of Montana. 109 p. Thesis.
- Fish, Ernest B.; Brothers, Gene L. 1981. Erosional impacts of trails in Guadalupe Mountains National Park, Texas. *Landscape Planning*. 8: 387–398.
- Fitzhugh, Elvin D. 1985. The conflict between hikers and horseusers in the Bob Marshall Wilderness complex. Missoula: University of Montana. 109 p. Thesis.
- Flewelling, Bob; Johnson, Darryll R. 1982. Backcountry permit compliance in Olympic National Park. Rep. CPSU/UW 82-5. Seattle: University of Washington. 36 p.
- Flood, Joseph Patrick. 1999. The influence of site restoration programs on wilderness visitor experience and visitor opinions of managers. St. Paul, MN: University of Minnesota, Division of Recreation, Park and Leisure Studies. 59 p. Thesis.
- Flood, Joseph P.; McAvoy, Leo H. 2000. The influence of wilderness restoration programs on visitor experience and visitor opinions of managers. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. Wilderness science in a time of change conference—Volume 5: wilderness ecosystems, threats, and management; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-5. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 193–198.
- Frissell, Sidney S., Jr. 1963. Recreational use of campsites in the Quetico-Superior Canoe Country. St. Paul: University of Minnesota. 66 p. Thesis.
- Frissell, Sidney S. 1973. The impact of wilderness visitors on natural ecosystems. Unpublished report on file at: University of Montana, Missoula. 60 p.
- Frissell, Sidney S., Jr.; Duncan, Donald P. 1965. Campsite preference and deterioration in the Quetico-Superior canoe country. *Journal of Forestry*. 63(4): 256–60.
- Gentile, Jack; Coffey, Darren; West, Eric; [and others]. 1991. Assessment of users and user impacts in the St. Mary's and Ramsey's Draft Wilderness Areas: a report on research. Unpublished report on file at: James Madison University, Harrisonburg, VA.
- Gentile, Jack; Connel, Timothy; Elam, David. 1992. Research and activities in St. Mary's and Ramsey's Draft Wilderness Areas, 1992: a summary report. Unpublished report on file at: James Madison University, Harrisonburg, VA.
- Gentile, Jack; West, Eric; Coffey, Darren. 1990. Monitoring user impacts in the St. Mary's Wilderness: a report on research. Unpublished report on file at: James Madison University, Harrisonburg, VA.
- Gettinger, Dean S.; Krumpke, Edwin E.; Wright, Richard G. 1998. Recreational impacts to wilderness campsites at North Cascades National Park. Natural Resources Rep. NPS/CCSOUI/NRTR-98/14. Moscow, ID: U.S. Geological Survey, Biological Resources Division, University of Idaho Wildlife Management Institute. 109 p.
- Graefe, Alan R.; Thapa, Brijesh; Confer, John J.; Absher, James D. 2000. Relationships between trip motivations and selected variables among Allegheny National Forest visitors. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. Wilderness science in a time of change conference—Volume 4: wilderness visitors, experiences, and visitor management; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-4. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 107–112.
- Haas, Glenn E. 1979. User preferences for recreation experience opportunities and physical resource attributes in three Colorado Wilderness Areas. Fort Collins: Colorado State University, Department of Recreation Resources. 141 p. Dissertation.
- Haas, Glenn E.; Arnold, J. Ross; Brown, Perry J.; Driver, B.L. 1982. Final report of the research results for the cooperative management-research demonstration project focusing on the Maroon Bells-Snowmass Wilderness in Colorado. Unpublished paper on file at: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO. 93 p.
- Hall, Christine N. 1989. Using impact indices and baseline data to assess the conditions of an Eastern wilderness: a case study of the Dolly Sods Wilderness, Monongahela National Forest, West Virginia. College Park: University of Maryland. 315 p. Dissertation.
- Hall, Christine N.; Kuss, Fred R. 1989. Vegetation alteration along trails in Shenandoah National Park, Virginia. *Biological Conservation*. 48: 211–227.
- Hall, Troy; Cole, David. 2000. An expanded perspective on displacement: a longitudinal study of visitors to two wildernesses in the Cascade Mountains of Oregon. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. Wilderness science in a time of change conference—Volume 4: wilderness visitors, experiences, and visitor management; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-4. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 113–121.

- Hall, Troy; Shelby, Bo. 1994. Eagle Cap Wilderness: recreational use and impacts. Corvallis, OR: Oregon State University. Unpublished report on file at: Eagle Cap Ranger District, Wallawa-Whitman National Forest, U.S. Forest Service, Enterprise, OR.
- Hammitt, William E.; Rutlin, William M. 1995. Use encounter standards and curves for achieved privacy in wilderness. *Leisure Sciences*. 17(4): 245–262.
- Hammond, Timothy P. 1994. Factors affecting attention to and retention of low-impact messages on bulletin boards. Missoula: University of Montana. 140 p. Thesis.
- Harris, Charles C. 1978. Crowding in a wilderness setting: the influence of social interaction on users' satisfaction. Fort Collins: Colorado State University. Thesis.
- Heberlein, Thomas A.; Dunwiddie, Peter. 1979. Systematic observations of use levels, campsite selection and visitor characteristics at a high mountain lake. *Journal of Leisure Research*. 11(4): 307–316.
- Helgath, Sheila F. 1974. Selway-Bitterroot Wilderness trail deterioration study. Pullman: Washington State University. 103 p. Thesis.
- Helgath, Sheila F. 1975. Trail deterioration in the Selway-Bitterroot Wilderness. Res. Note INT-193. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 15 p.
- Hendee, John C.; Catton, William R., Jr.; Marlow, Larry D.; Brockman, C. Frank. 1968. Wilderness users in the Pacific Northwest—their characteristics, values, and management preferences. Res. Pap. PNW-61. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station. 92 p.
- Hendee, John C.; Clark, Roger N.; Dailey, Thomas E. 1977. Fishing and other recreation behavior at high-mountain lakes in Washington State. Res. Note PNW-304. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station. 27 p.
- Hill, L. Bruce; Harper, Wendy; Halstead, John M.; Stevens, Thomas H.; Porras, Ina; Kimball, Kenneth D. 2000. Visitor perceptions and valuation of visibility in the Great Gulf Wilderness, New Hampshire. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. *Wilderness science in a time of change conference—Volume 5: wilderness ecosystems, threats, and management*; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-5. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 304–311.
- Hockett, Karen; Hall, Troy. 1999. Shenandoah National Park backcountry and wilderness visitor survey. Unpublished report on file at: U.S. Department of the Interior, National Park Service, Shenandoah National Park, Virginia. 165 p.
- Hockett, Karen S.; Hall, Troy E. 2000. Visitors' knowledge of Federal wilderness: implications for wilderness user research and management. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. *Wilderness science in a time of change conference—Volume 4: wilderness visitors, experiences, and visitor management*; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-4. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 122–127.
- Hockett, Karen S.; Roggenbuck, Joseph W.; Yoder, Andrew D. 2002. Okefenokee wilderness visitors' characteristics, perceptions, and management preferences. Unpublished report on file at: Okefenokee National Wildlife Refuge, Folkston, GA. 193 p.
- Holmes, David O. 1973. Yosemite backcountry inventory: summer 1972. Unpublished paper on file at: Yosemite National Park, Research Center, El Portal, CA.
- Hoover, Sharon L.; King, David A.; Matter, William J. 1985. A wilderness riparian environment: visitor satisfaction, perceptions, reality, and management. In: Johnson, R. Roy, comp. *Interagency North American riparian conference: riparian ecosystems and their management: reconciling conflicting uses*; 1985 April 16–18; Tucson, AZ. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station: 223–226.
- Hoss, Amy F.; Brunson, Mark W. 2000. Meanings and implications of acceptability judgments for wilderness use impacts. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. *Wilderness science in a time of change conference—Volume 4: wilderness visitors, experiences, and visitor management*; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-4. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 128–133.
- Huff, Gregory S. 1995. Assessment of recreational site impact at the Upper Kiamichi River Wilderness. Stillwater: Oklahoma State University. 242 p. Thesis.
- Hughes, Janet L. 1985. Winter backcountry campers in the Great Smoky Mountains National Park: their behavior, use patterns, and characteristics. Knoxville: University of Tennessee. Thesis.
- Hunger, Donald H.; Christensen, Neal A.; Becker, Kurt G. 1999. Commercial and private boat use on the Salmon River in the Frank Church-River of No Return Wilderness, United States. *International Journal of Wilderness*. 5(2): 31–36.
- Hunger, Donald H.; Hancock. 1996. Defining potential human experience indicators and standards on the Main Stem and Middle Fork of the Salmon River in Idaho: summer, 1995. Olympia, WA: Evergreen State College. 142 p. Thesis.
- Johnson, Darryl R. 1978. A statistical summary of selected data from the backcountry users survey. Unpublished report on file at: Cooperative Ecosystem Studies Unit, University of Washington, Seattle.
- Johnson, Darryl R. 1985. Tatsenshini Alsek River recreation study 1984: statistical abstract. Unpublished report on file at: Cooperative Ecosystem Studies Unit, University of Washington, Seattle.
- Johnson, Laura C.; Wallace, George N.; Mitchell, John E. 1997. Visitor perceptions of livestock grazing in five U.S. wilderness areas—a preliminary assessment. *International Journal of Wilderness*. 3(2): 14–20.
- Johnson, Marianne Evelyn. 1989. Recreational impact on the Indian Peaks Wilderness Area, Colorado. Fort Collins, CO: Colorado State University. 147 p. Thesis.
- Jubenville, Alan. 1970. Travel patterns of wilderness users in the Anaconda-Pintlar Wilderness. Missoula, MT: University of Montana. 240 p. Dissertation.
- Jubenville, Alan. 1971. A test of differences between wilderness recreation party leaders and party members. *Journal of Leisure Research*. 3(2): 116–119.
- Kantola, W. W. 1976. Opinions and preferences of visitors toward alternatives for limiting use in the backcountry of Sequoia and Kings Canyon National Parks. Eugene: University of Oregon. 83 p. Thesis.
- Kelley, Mark D. 1979. Individual and social motive factors influencing recreation participation in the Rattlesnake backcountry, 1976. Missoula: University of Montana. 176 p. Thesis.
- Kennedy, James J.; Brown, Perry J. 1976. Attitudes and behavior of fishermen in Utah's Uinta Primitive Area. *Fisheries*. 1(6): 15–17, 30–31.
- Kiely-Brocato, Kathleen. 1980. An assessment of visitor attitudes towards resource use and management. *Journal of Environmental Education*. 11(4): 29–36.
- Kohls, Steven J. 1986. Human behavior and attitudes toward wilderness and its associated wildlife: a case study of the Boundary Waters Canoe Area Wilderness. Unpublished report on file at: Yale University, New Haven, CT. 169 p.
- Krumpe, Edwin E. 1979. Redistributing backcountry use by a behaviorally based communications device. Fort Collins: Colorado State University. 156 p. Dissertation.
- Kuzmic, Thomas. 1993. Characteristics of visitors and recreational use of the Upper Kiamichi River Wilderness in Oklahoma. Stillwater: Oklahoma State University. 334 p. Dissertation.
- Lah, Kristopher J. 2000. Developing social standards for wilderness encounters in Mount Rainer National Park: manager-defined versus visitor-defined standards. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. *Wilderness science in a time of change conference—Volume 4: wilderness visitors, experiences, and visitor management*; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-4. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 134–141.
- Lee, Robert G. 1975. The management of human components in the Yosemite National Park ecosystem. Unpublished report on file at: U.S. Department of the Interior, National Park Service, San Francisco, CA.
- Lee, Robert G. 1977. Alone with others: the paradox of privacy in wilderness. *Leisure Sciences*. 1(1): 3–19.

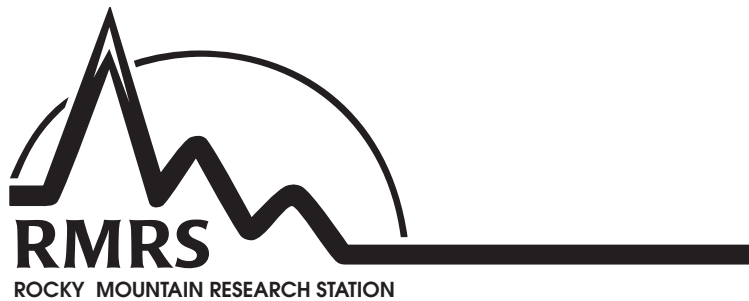
- Leung, Yu-Fai; Marion, Jeffrey L. 2000. Wilderness campsite conditions under an unregulated camping policy: an Eastern example. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. Wilderness science in a time of change conference—Volume 5: wilderness ecosystems, 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: 148–152.
- Lewis, Jeffery William. 1971. Perception of desert wilderness by the Superstition Wilderness user. Tucson: University of Arizona. 124 p. Thesis.
- Lime, David W. 1972. Large groups in the Boundary Waters Canoe Area—their numbers, characteristics, and impacts. Res. Note NC-142. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 4 p.
- Lime, David W.; Fox, Karen M.; Jeong, Gang Hoan; Lewis, Michael S. 1990. Wildland recreation research in the Western Lake Superior basin: an annotated bibliography, 1990. Misc. Publ. 66-1990. St. Paul: University of Minnesota, Minnesota Agricultural Experiment Station. 62 p.
- Littlejohn, Margaret. 1994. Visitor services project: Death Valley National Monument backcountry. Visitor Services Project Rep. 64. Moscow: University of Idaho, Cooperative Park Studies Unit. 43 p.
- Littlejohn, Margaret. 1999. Cumberland Island National Seashore visitor study—spring 1998. Moscow: University of Idaho, Cooperative Park Studies Unit.
- Love, Timothy G.; Watson, Alan E. 1992. Effects of the Gates Park Fire on recreation choices. Res. Pap. INT-402. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 7 p.
- Lucas, Robert C. 1962. The Quetico-Superior area: recreational use in relation to capacity. Minneapolis: University of Minnesota. Dissertation.
- Lucas, Robert C. 1964a. Wilderness perception and use: the example of the Boundary Waters Canoe Area. *Natural Resources Journal*. 3(3): 394–411.
- Lucas, Robert C. 1964b. The recreational capacity of the Quetico-Superior area. Res. Pap. LS-15. St. Paul, MN: U.S. Department of Agriculture, Forest Service, Lake States Forest Experiment Station. 34 p.
- Lucas, Robert C. 1970. User concepts of wilderness and their implications for resource management. In: Proshansky, Harold M.; Helson, William H.; Rivlin, Leanne G., eds. *Environmental psychology: man and his physical setting*. New York: Holt, Rinehart, and Winston, Inc.: 297–300.
- Lucas, Robert C. 1980. Use patterns and visitor characteristics, attitudes, and preferences in nine wilderness and other roadless areas. Res. Pap. INT-253. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 89 p.
- Lucas, Robert C. 1985. Visitor characteristics, attitudes, and use patterns in the Bob Marshall Wilderness complex, 1970–82. Res. Pap. INT-345. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 32 p.
- Manfredo, Michael J. 1979. Wilderness experience opportunities and management references for three Wyoming wilderness areas. Fort Collins: Colorado State University. 112 p. Dissertation.
- Marion, Jeffrey L. 1984. Ecological changes resulting from recreational use: a study of backcountry campsites in the Boundary Waters Canoe Area. St. Paul: University of Minnesota. 279 p. Dissertation.
- Marion, Jeffrey L.; Haskell, David. 1988. An analysis of visitor impacts and rehabilitation methods for backcountry campsites at Shenandoah National Park. Rep. 4840-RMVP-N-61. U.S. Virginia: Department of the Interior, National Park Service, Shenandoah National Park. 38 p.
- Marion, Jeffrey L.; Merriam, Lawrence C. 1985a. Predictability of recreational impact on soils. *Soil Science Society of America Journal*. 49: 751–753.
- Marion, Jeffrey L.; Merriam, Lawrence C. 1985b. Recreational impacts on well-established campsites in the Boundary Waters Canoe Area Wilderness. Station Bull. AD-SB-2502. St. Paul, MN: University of Minnesota, Agricultural Experiment Station. 15 p.
- Martin, Steven R. 2000. Donations as an alternative to wilderness user fees—the case of the Desolation Wilderness. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. Wilderness science in a time of change conference—Volume 4: wilderness visitors, experiences, and visitor management; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-4. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 142–147.
- McCool, Stephen F.; Cole, David N. 2000. Communicating minimum impact behavior with trailside bulletin boards: visitor characteristics associated with effectiveness. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. Wilderness science in a time of change conference—Volume 4: wilderness visitors, experiences, and visitor management; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-4. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 208–216.
- McCool, Stephen F.; Martin, Steven R.; Yuan, Michael. 1990. The 1989 Bear Trap Canyon visitor study. Res. Rep. 13. Missoula: University of Montana, School of Forestry, Institute for Tourism and Recreation Research.
- McCool, Stephen F.; Merriam, L. C., Jr.; Cushwa, Charles T. 1969. The condition of wilderness campsites in the Boundary Waters Canoe Area. Minnesota Forestry Res. Note 202. St. Paul: University of Minnesota, School of Forestry. 4 p.
- McCool, Stephen F.; Stankey, George H. 1986. Visitor attitudes toward wilderness fire management policy, 1971–84. Res. Pap. INT-357. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 7 p.
- McEwen, Douglas; Cole, David N.; Simon, Mark. 1996. Campsite impacts in four wildernesses in the South-Central United States. INT-RP-490. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 12 p.
- Merriam, L. C., Jr. 1963. A land use study of the Bob Marshall Wilderness area of Montana. Bull. 26. Missoula: University of Montana, School of Forestry, Forest and Conservation Experiment Station. 190 p.
- Merriam, L. C., Jr.; Ammons, R. B. 1968. The wilderness user in three Montana areas. St. Paul: University of Minnesota, School of Forestry; Missoula: University of Montana, School Forestry. 54 p.
- Merriam, Lawrence C.; Peterson, R. F. 1983. Impact of 15 years of use on some campsites in the BWCA. Minnesota Forestry Res. Note 282. St. Paul: University of Minnesota, College of Forestry. 4 p.
- Merriam, L. C., Jr.; Smith, C. K. 1974. Visitor impact on newly developed campsites in the Boundary Waters Canoe Area. *Journal of Forestry*. 72(10): 627–630.
- Merriam, L. C., Jr.; Smith, C. K. 1975. Newly established campsites in the Boundary Waters Canoe Area restudy of selected sites—1974. Minnesota Forestry Res. Notes 254. St. Paul: University of Minnesota, School of Forestry. 4 p.
- Merriam, L. C., Jr.; Smith, C. K.; Miller, D. E.; Huang, Ching tiao; Tappeiner, J. C., II; Goeckermann, Kent; Bloemendal, J. A.; Costello, T. M. 1973. Newly developed campsites in the Boundary Waters Canoe Area: a study of 5 years' use. Station Bull. 511. St. Paul: University of Minnesota, Agricultural Experiment Station. 27 p.
- Michael, Jeffery A.; Reiling, Stephen; Cheng, Hsiang-Tai. 1994. Factors affecting the value of a wilderness visit: a contingent valuation study of Caribou-Speckled Mountain Wilderness users. In: Vander Stoep, Gail A., comp. Proceedings of the 1994 Northeastern recreation research symposium; 1994 April 10–12; Sarasota Springs, NY. Gen. Tech. Rep. NE-198. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station: 135–137.
- Moore, Steven D.; Brickler, Stanley K.; Shockey, James W.; King, David A. 1989. Sociological aspects of recreation at Aravaipa Canyon Wilderness, Arizona. Unpublished report on file at: U.S. Department of the Interior, Bureau of Land Management, Safford District Office, Safford, AZ. 145 p.
- Moorhead, Bruce B.; Schreiner, Edward S. 1979. Management studies of human impact at backcountry campsites in Olympic National Park, Washington. In: Linn, Robert M., ed. Proceedings of the first conference on scientific research in the national

- parks—Vol. 2; 1976 November 9–12; New Orleans, LA. Washington, DC: National Park Service transactions and proceedings series, number 5: 1273–1278.
- Moritsch, B. J.; Muir, P. 1993. Subalpine revegetation on backcountry campsites near Tuolumne Meadows, Yosemite National Park, California: changes in vegetation after three years. *Natural Areas Journal*. 13: 155–163.
- Nellis, Julie G. 1996. Visitors, perceptions and the wilderness experience. Northridge: California State University, Northridge. Thesis.
- Olsen, Scott. 1998. Visitor response to a fee demonstration pilot project in the Paria Canyon—Vermillion Cliffs Wilderness Area. Flagstaff: Northern Arizona University. 53 p. Thesis.
- Olsen, Scott. 1999. Results of Paria Canyon/Coyote Buttes recreation test fee demonstration pilot project visitor survey. Unpublished report on file at: U.S. Department of the Interior, Bureau of Land Management, Arizona Strip Field Office and Kanab Field Office. 44 p.
- Orr, Taylor. 1983. The feasibility of implementing a campfire closure in a heavily used portion of Eagle Cap Wilderness. Unpublished report on file at: U.S. Department of Agriculture, Forest Service, Wallowa-Whitman National Forest, Eagle Cap Ranger District, Enterprise, OR. 52 p.
- Overton, Deborah J. 1991. Campsite change due to minimum and traditional impact behavior practices. Fort Collins: Colorado State University. 156 p. Dissertation.
- Papenfuse, Meghan A.; Roggenbuck, Joseph W.; Hall, Troy E. 2000. The rise of the day visitor in wilderness: should managers be concerned? In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. *Wilderness science in a time of change conference—Volume 4: wilderness visitors, experiences, and visitor management*; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-4. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 149–154.
- Parker, Julia Dawn; Avant, Bill. 1999. Caney Creek Wilderness recreation: a preliminary report. Unpublished report on file at: University of Arkansas, School of Forest Resources, Monticello, AR.
- Parker, Julia Dawn; Winter, Patricia L. 1998. A case study of communication with Anglo and Hispanic wilderness visitors. Research brief. *Journal of Interpretation Research*. 3(1): 55–56.
- Parsons, David J.; Stohlgren, Thomas J. 1987. Impacts of visitor use on backcountry campsites in Sequoia and Kings Canyon National Parks, California. Tech. Rep. 25. Davis, CA: U.S. Department of the Interior, National Park Service, Cooperative Park Studies Unit, University of California at Davis. 79 p.
- Patterson, Michael E.; Williams, Daniel R. 1991. A transactional approach to characterizing relationship to resource. In: Williams, D. R.; Patterson, M. E.; comp. *Conceptual and empirical analysis of visitors' relationship to resource*. Blacksburg: Virginia Polytechnic Institute and State University, College of Forest and Wildlife Resources, Department of Forestry: 1–32.
- Peterson, George L. 1971. Motivations, perceptions, satisfactions and environmental dispositions of Boundary Waters Canoe Area users and managers: a pilot study. Final report, cooperative research project 13-253 between Northwestern University and the North Central Forest Experiment Station. Evanston, IL: Northwestern University Technological Institute, Department of Civil Engineering; U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station: 264 p.
- Pierskalla, Chad; Anderson, Dorothy H.; Lime, David W. 1997. Isle Royale National Park 1996 Visitor Survey. Unpublished report on file at: St. Paul: University of Minnesota, Department of Forest Resources.
- Pierskalla, Chad D.; Anderson, Dorothy H.; Lime, David W. 2000. Examining leisure event opportunities of Isle Royale National Park: bridging the gap between social processes and spatial form. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. *Wilderness science in a time of change conference—Volume 4: wilderness visitors, experiences, and visitor management*; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-4. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 155–159.
- Puttkammer, Annette. 1994. A managerial and theoretical approach to the management of the Mount Shasta Wilderness. Fort Collins: Colorado State University. 69 p. Thesis.
- Ramthun, Roy; Kersey, Lynda; Rogers, Jim. 2000. Information collection styles of wilderness users: a market segmentation approach. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. *Wilderness science in a time of change conference—Volume 4: wilderness visitors, experiences, and visitor management*; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-4. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 217–220.
- Ranz, Beth. 1979. Closing wilderness campsites: visitor use problems and ecological recovery in the Selway-Bitterroot Wilderness, Montana. Missoula: University of Montana. 125 p. Thesis.
- Robertson, Rachel D. 1981. An investigation of visitor behavior in wilderness areas. Iowa City: University of Iowa. 174 p. Dissertation.
- Robertson, Rachel D. 1986. Actual versus self-reported wilderness visitor behavior. In: Lucas, Robert C., comp. *Proceedings—national wilderness research conference: current research*; 1985 July 23–26; Fort Collins, CO. Gen. Tech. Rep. INT-212. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station: 326–332.
- Rocheft, Regina M.; Swinney, Darin D. 2000. Human impact surveys in Mount Rainier National Park: past, present, and future. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. *Wilderness science in a time of change conference—Volume 5: wilderness ecosystems, threats, and management*; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-5. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 165–171.
- Rogers, Paul. 1986. Campsite impacts in the High Uintas Wilderness Area: a study of two altitudinal zones. Madison: University of Wisconsin. 110 p. Thesis.
- Roggenbuck, Joseph W. 1980. Wilderness user preferences: Eastern and Western areas. In: *Proceedings of the wilderness management symposium*; 1980 November 13–15; Knoxville, TN: University of Tennessee. U.S. Department of Agriculture, Forest Service. 103–146.
- Roggenbuck, Joseph W.; Berrier, Deborah L. 1980. The effectiveness of information on dispersing wilderness campers. Unpublished report on file at: Blacksburg: Virginia Polytechnic Institute and State University, Department of Forestry.
- Roggenbuck, Joseph W.; Dawson, Michael S. 1979. Recreation experience preferences of wilderness and backcountry hikers: Linville Gorge Wilderness, Shining Rock Wilderness, Joyce Kilmer-Slickrock Wilderness and Shenandoah National Park. Unpublished report on file at: Virginia Polytechnic Institute and State University, School of Forestry and Wildlife Resources, Blacksburg, VA. 163 p.
- Roggenbuck, Joseph W.; Stubbs, Christopher J. 1991. Changes in wilderness visits, visitors, problems, and preferences at Shining Rock Wilderness: 1978 and 1990. Unpublished report on file at: U.S. Department of Agriculture, Forest Service, Intermountain Research Station, Missoula, MT. 162 p.
- Roggenbuck, Joseph W.; Timm, Wendy N.; Watson, Alan E. 1979. Visitor perception of the recreation carrying capacity of three wilderness areas in North Carolina: Linville Gorge Wilderness, Shining Rock Wilderness, Joyce Kilmer-Slickrock Wilderness. Unpublished report on file at: Virginia Polytechnic Institute and State University, School of Forestry and Wildlife Resources, Blacksburg, VA. 303 p.
- Roggenbuck, Joseph W.; Watson, Alan E.; Stankey, George H. 1982. Wilderness management in the Southern Appalachians. *Southern Journal of Applied Forestry*. 6(3): 147–152.
- Roggenbuck, Joseph W.; Widner, Carolyn J.; Williams, Daniel R. 1994. Mount Rogers NRA High Country use and user management 1992–93. Unpublished report on file at: U.S. Department of Agriculture, Forest Service, Jefferson National Forest, Roanoke, VA.
- Roggenbuck, Joseph W.; Williams, Daniel R.; Watson, Alan E. 1993. Defining acceptable conditions in wilderness. *Environmental Management*. 17(2): 187–197.
- Rutlin, William R.; Hammitt, William E. 1994. Ellicott Rock Wilderness visitor study: a survey of users and use patterns. Unpublished report on file at: Clemson University, Department of Parks, Recreation and Tourism Management, Clemson, SC. 92 p.
- Salvi, W. C.; Johnson, Darryl R. 1985. Glacier Bay backcountry users study 1984: statistical abstract. Unpublished report on file at: Cooperative Ecosystem Studies Unit, University of Washington, Seattle.

- Saunders, Paul R. 1985. Shining Rock Wilderness: impacts of dispersed use. In: Kulhavy, David L.; Conner, Richard N., eds. *Wilderness and natural areas in the Eastern United States: a management challenge*. Nacogdoches, TX: Stephen F. Austin University, School of Forestry, Center for Applied Studies: 260–264.
- Saunders, Paul Richard. 1986. Shining Rock Wilderness: impacts of dispersed use. In: Kulhavy, David L.; Conner, Richard N., eds. *Wilderness & natural areas in Eastern North America: a management challenge*. Nacogdoches, TX: Stephen F. Austin State University, School of Forestry, Center for Applied Studies in Forestry: 260–264.
- Schneider, Ingrid E. 2000. Responses to conflict in urban-proximate areas. *Journal of Park and Recreation Administration*. 18(2): 37–53.
- Schneider, Ingrid E.; Hammitt, William E. 1995. Visitor responses to on-site recreation conflict. *Journal of Applied Recreation Research*. 20(4): 249–268.
- Schneider, Ingrid; LaPointe, Christopher; Stievater, Sharon. 2000. Perceptions of and preferences for fee program utilization among wilderness visitors. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. *Wilderness science in a time of change conference—Volume 4: wilderness visitors, experiences, and visitor management*; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-4. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 164–166.
- Schreiner, Edward G. S.; Moorhead, Bruce B. 1976. Human impact studies in Olympic National Park. In: *Proceedings on the symposium of terrestrial and aquatic ecological studies of the Northwest*; 1976 March 26–27; Cheney, WA. Cheney: Eastern Washington State College: 59–66.
- Schreiner, Edward G. S.; Moorhead, Bruce B. 1979. Human impact inventory and management in the Olympic National Park backcountry. In: Ittner, Ruth; Potter, Dale R.; Agee, James K.; Anschell, Susan, eds. *Recreational impact on wildlands: conference proceedings*; Seattle, WA. U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station; U.S. Department of the Interior, National Park Service: 203–212.
- Schuster, Rudy M. 2000. Coping with stressful situations and hassles during outdoor recreation experiences in wilderness environments. Clemson, SC: Clemson University. Dissertation.
- Scuderi, Michael Robert. 1981. An examination of the spatial behavior of wilderness users, with special reference to campsite selection—a case study in Sequoia and Kings Canyon National Parks, California. Seattle: University of Washington. 174 p. Thesis.
- Setran, Marie T. 1978. A study of social carrying capacities for San Jacinto Wilderness. Long Beach: California State University, Long Beach. 104 p. Thesis.
- Shafer, Carl Scott. 1993. The relationships among wilderness experience dimensions, conditions of concern and coping behaviors: applying descriptors of designated wilderness. Clemson, SC: Clemson University. 240 p. Dissertation.
- Shafer, C. Scott; Hammitt, William E. 1995. Congruency among experience dimensions, condition indicators, and coping behaviors in wilderness. *Leisure Sciences*. 17(4): 263–279.
- Sheehan, M. 1989. The Cactus Forest trails—a trail user questionnaire analysis. Unpublished report on file at: University of Arizona, School of Renewable Natural Resources, Tucson, AZ. 44 p.
- Shelby, Bo; Goodwin, Jay; Brunson, Mark; Anderson, David. 1989. Impacts of recreation use limits in the Alpine Lakes Wilderness. Unpublished report on file at: Department of Forest Resources, Oregon State University, Corvallis, OR. 105 p.
- Shelby, Bo; Harris, Richard. 1985. Comparing methods for determining visitor evaluations of ecological impacts: site visits, photographs, and written descriptions. *Journal of Leisure Research*. 17(1): 57–67.
- Shelby, Bo; Harris, Rick. 1986. User standards for ecological impacts at wilderness campsites. In: Lucas, Robert C., comp. *Proceedings—national wilderness research conference: current research*; 1985 July 23–26; Fort Collins, CO. Gen. Tech. Rep. INT-212. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station: 166–171.
- Shelby, Bo; Vaske, Jerry J.; Harris, Rick. 1988. User standards for ecological impacts at wilderness campsites. *Journal of Leisure Research*. 20(3): 245–256.
- Simon, Larry. 1978. Soil physical properties of selected campsites under varying use levels in the Kearsarge-Bullfrog-Charlotte Lakes area of Kings Canyon National Park.. Unpublished report on file at: Kings Canyon National Park, Three Rivers, CA. 53 p.
- Snyder, Donald L.; Fawson, Christopher; Godfrey, E. Bruce; Keith, John E.; Lilieholm, Robert J. 1995. Wilderness designation in Utah: issues and potential economic impacts. Utah Agricultural Experiment Station Res. Rep. 151. Logan, UT: Utah State University. 257 p.
- Sommarstrom, Allan Ralph. 1966. The impact of human use on recreational quality: the example of the Olympic National Park backcountry user. Seattle: University of Washington. 79 p. Thesis.
- Spildie, David R.; Cole, David N.; Walker, Sarah C. 2000. Effectiveness of a confinement strategy in reducing pack stock impacts at campsites in the Selway-Bitterroot Wilderness, Idaho. In: Cole, David N.; McCool, Stephen F.; Borrie, William T.; O'Loughlin, Jennifer, comps. *Wilderness science in a time of change conference—Volume 5: wilderness ecosystems, threats, and management*; 1999 May 23–27; Missoula, MT. Proc. RMRS-P-15-VOL-5. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 199–208.
- Stankey, George H. 1973. Visitor perception of wilderness recreation carrying capacity. Res. Pap. INT-142. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 61 p.
- Stankey, George H. 1979. Use rationing in two southern California wildernesses. *Journal of Forestry*. 77(5): 347–349.
- Stankey, George H. 1980. A comparison of carrying capacity perceptions among visitors to two wildernesses. Res. Pap. INT-242. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 34 p.
- Stewart, William P. 1991. Compliance with fixed-itinerary systems in water-based parks. *Environmental Management*. 15 (2): 235–240.
- Stohlgren, Thomas J. 1982. Vegetation and soil recovery of subalpine campsites in Sequoia National Park, California. Fresno: California State University, Fresno. 49 p. Thesis.
- Stohlgren, Thomas J. 1986. Variation of vegetation and soil characteristics within wilderness campsites. In: Lucas, Robert C., comp. *Proceedings—National wilderness research conference: current research*; Fort Collins, CO. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station: 152–157.
- Stohlgren, Thomas J.; Parsons, David J. 1986. Vegetation and soil recovery in wilderness campsites closed to visitor use. *Environmental Management*. 10(3): 375–380.
- Stohlgren, Thomas J.; Parsons, David J. 1992. Evaluating wilderness recreational opportunities: application of an impact matrix. *Environmental Management*. 16(3): 397–403.
- Stoner, Mary Alice Taylor. 1976. Identification of the Selway-Bitterroot wilderness airplane access users in comparison with conventional access users. East Lansing: Michigan State University, Department of Park and Recreation Resources. 103 p. Thesis.
- Stubbs, Christopher J. 1991. Low-impact recreational practices: assessing and improving wilderness user knowledge, behavioral intentions, and behavior. Blacksburg: Virginia Polytechnic Institute and State University. 119 p. Thesis.
- Stubbs, Christopher J.; Roggenbuck, Joseph W. 1994. Assessing and improving wilderness recreationists' low-impact knowledge, behavioral intentions, and behavior. In: Sydoriak, Charisse, comp. *Wilderness: the spirit lives*. 6th national wilderness conference; 1994 November 14–18; Santa Fe, NM: 109–112.
- Swanson, Jane; Vande Kamp, Mark; Johnson, Darryl R. 2002a. A survey of overnight backcountry visitors to Denali National Park and Preserve. Unpublished report on file at: Cooperative Ecosystem Studies Unit, University of Washington, Seattle.
- Swanson, Jane; Vande Kamp, Mark; Johnson, Darryl R. 2002b. A survey of overnight backcountry visitors to Mount Rainier National Park. Unpublished report on file at: Cooperative Ecosystem Studies Unit, University of Washington, Seattle.
- Sydoriak, Charisse A. 1986. Yosemite wilderness trail and campsite impact monitoring system. Unpublished report on file at: U.S. Department of the Interior, National Park Service, Yosemite National Park, Yosemite, CA. 25 p.

- Tarrant, Michael A.; Schafer, C. Scott. 1998. A comparison of preferred experiences and setting conditions in one Eastern and one Western wilderness area. In: Kulhavy, David L.; Legg, Michael H., eds. *Wilderness & natural areas in Eastern North America: research, management, and planning*. Nacogdoches, TX: Stephen F. Austin State University, Arthur Temple College of Forestry, Center for Applied Studies in Forestry: 200–204.
- Taves, Marvin; Hathaway, William; Bultena, Gordon. 1960. *Canoe country vacationers*. Misc. Rep. 39. St. Paul: University of Minnesota, Agricultural Experiment Station. 28 p.
- Thorn, Todd F. 1994. Teaching low-impact camping practices to wilderness backpackers: an evaluation of trailhead information signing and personal contact. Logan: Utah State University. 121 p. Thesis.
- Thornburgh, Dale A. 1962. An ecological study of the effect of man's recreational use at two subalpine sites in western Washington. Berkeley: University of California, Berkeley. 50 p. Thesis.
- Trench, Kesia; Wallace, George N. 1994. Norms held by rock climbers for different settings in Joshua Tree National Monument. In: Sydoriak, Charisse, comp. *Wilderness: the spirit lives*. 6th national wilderness conference; 1994 November 14–18; Santa Fe, NM: 78–90.
- Vande Kamp, Mark E.; Johnson, Darryl R.; Swanson, Jane E. 1998. Mount Rainier National Park—1993 Spray Park visitor survey. USGS/BRD/FRESC. Tech. Rep. NPS/CCSOUW/NRTR-98-04 NPS D-317. Seattle: University of Washington, College of Forest Resources. 294 p.
- Vande Kamp, Mark; Swanson, Jane; Johnson, Darryl R. 2000. A survey of wilderness trail users in Mount Rainier National Park. Tech. Rep. NPS/CCSOUW/NRTR-2000-01. Seattle: University of Washington, College of Forest Resources.
- Vande Kamp, Mark; Swanson, Jane; Johnson, Darryl, R. 2002. A survey of visitors hiking the Harding Icefield Trail in Kenai Fjords National Park. Unpublished report on file at: University of Washington, College of Forest Resource, Seattle, WA.
- Warren, Gregory A. 1980. Activities, attitudes and management preferences of visitors of the Arctic National Wildlife Range, Alaska. Moscow: University of Idaho. 51 p. Thesis.
- Warren, Gregory A. 1986. Activities, attitudes and management preferences of visitors of the Arctic National Wildlife Range, Alaska. In: Lucas, Robert C., comp. *Proceedings—national wilderness research conference: current research; 1985 July 23–26; Fort Collins, CO*. Gen. Tech. Rep. INT-212. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station: 278–286.
- Watson, Alan E. 1993. Characteristics of visitors without permits compared to those with permits at the Desolation Wilderness, California. Res. Note IN-414. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 7 p.
- Watson, Alan E. 1995. Opportunities for solitude in the Boundary Waters Canoe Area Wilderness. *Northern Journal of Applied Forestry*. 12(1): 12–18.
- Watson, Alan E.; Cronn, Rich; Christensen, Neal A. 1998a. Monitoring inter-group encounters in wilderness. Res. Pap. RMRS-RP-14. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 20 p.
- Watson, Alan E.; Hendee, John C.; Zaglauer, Hans P. 1996. Human values and codes of behavior: changes in Oregon's Eagle Cap Wilderness visitors and their attitudes. *Natural Areas Journal*. 16(2): 89–93.
- Watson, Alan E.; Hunger, Don; Christensen, Neal; Spildie, Dave; Becker, Kurt; Comstock, Jeff. 1998b. Wilderness boaters: protecting unique opportunities in the Frank Church-River of No Return Wilderness, Idaho, U.S.A. In: Watson, Alan E.; Aplet, Greg H.; Hendee, John C., comps. 1998. Personal, societal, and ecological values of wilderness: Sixth World Wilderness Congress proceedings on research, management, and allocation, volume 1; 1997 October; Bangalore, India. Proc. RMRS-P-4. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 151–158.
- Watson, Alan E.; Niccolucci, Michael J. 1992a. Place of residence and hiker-horse conflict in the Sierras. In: Chavez, Deborah J., ed. *Proceedings of the symposium on social aspects and recreation research; 1992 February 19–22; Ontario, CA*. Gen. Tech. Rep. PSW-GTR-132. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station: 71–72.
- Watson, Alan E.; Niccolucci, Michael J. 1992b. Defining past experience dimensions for wilderness recreation. *Leisure Sciences*. 14: 89–103.
- Watson, Alan E.; Niccolucci, Michael J.; Williams, Daniel R. 1993. Hikers and recreational stock users: predicting and managing recreation conflicts in three wildernesses. Res. Pap. INT-468. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 35 p.
- Watson, Alan E.; Niccolucci, Michael J.; Williams, Daniel R. 1994. The nature of conflict between hikers and recreational stock users in the John Muir Wilderness. *Journal of Leisure Research*. 26(4): 372–385.
- Watson, A.; Puttkamer, A.; Christensen, N. 1998c. Desolation Wilderness visitor response to fees. Unpublished report on file at: Aldo Leopold Wilderness Research Institute, Missoula, MT.
- Watson, Alan E.; Williams, Daniel R.; Roggenbuck, Joseph W.; Daigle, John J. 1992. Visitor characteristics and preferences for three national forest wildernesses in the South. Res. Pap. INT-455. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 27 p.
- Weesner, Margaret W. 1990. Relationships between campsite characteristics and level of recreation impact. Moscow: University of Idaho. 153 p. Thesis.
- Wellman, J. D.; Dawson, M. S.; Roggenbuck, J. W. 1982. Park manager's prediction of the motivation of visitors to two National Park Service areas. *Journal of Leisure Research*. 14: 1–15.
- Wenger, Wiley D. 1964. A test of unmanned registration stations on wilderness trails: factors influencing effectiveness. Res. Pap. PNW-16. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station.
- Wenger, Wiley D.; Gregersen, H. M. 1964. The effect of nonresponse on representativeness of wilderness-trail register information. Res. Pap. PNW-17. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station.
- Widner, Carolyn June. 1994. Conflict among hikers and horseback riders in the Mount Rogers High Country of Virginia. Blacksburg: Virginia Polytechnic Institute and State University. 104 p. Thesis.
- Wildland Research Center, University of California. 1962. *Wilderness and recreation—a report on resources, values and problems*. Review Commission Study Rep. 3. Washington, DC: Outdoor Recreation Resources. 352 p.
- Williams, Daniel R.; Patterson, Michael E.; Roggenbuck, Joseph W.; Watson, Alan E. 1992a. Beyond the commodity metaphor: examining emotional and symbolic attachment to place. *Leisure Sciences*. 14: 29–46.
- Williams, Daniel R.; Roggenbuck, Joseph W.; Patterson, Michael E.; Watson, Alan E. 1992b. The variability of user-based social impact standards for wilderness management. *Forest Science*. 38(4): 738–756.
- Williams, Peter B. 1994. Backcountry campsite conditions assessed for Limits of Acceptable Change planning in Shenandoah National Park. Blacksburg: Virginia Polytechnic Institute and State University. 185 p. Thesis.
- Williams, Peter B.; Marion, Jeffrey L. 1995. Backcountry campsite conditions assessed for Limits of Acceptable Change planning in Shenandoah National Park. Tech. Rep. NPS/MARSHEN/NRTR-95/071. Blacksburg, VA: Cooperative Park Studies Unit, U.S. Department of the Interior, National Biological Service, Virginia Tech, Department of Forestry. 137 p.
- Williams, Peter B.; Marion, Jeffrey L. 1997. Assessment of backcountry campsite conditions in Big Bend National Park. Res./Resour. Manage. Rep. Texas: U.S. Department of the Interior, National Park Service, Southwest Region, Big Bend National Park. 112 p.
- Winter, Patricia L. 1996. San Geronio Wilderness visitor survey: summer and fall, 1994. Unpublished paper on file at: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station, Riverside, CA. 34 p.
- Winter, Patricia L.; Marcus-Newhall, Amy; Cannon, Joanna. 1997. 1997 San Geronio study report. Unpublished paper on file at: Riverside, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. 21 p.

- Winter, Patricia L.; Meyer, Andrea; Marcus-Newhall, Amy. 1999. South Fork and Momyer trailheads San Geronio Wilderness recreational activities project report. Unpublished paper on file at: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station, Riverside, CA. 27 p.
- Womble, Peter. 1981. The response of hikers to being in the presence of others: the study of crowding and social gathering in Alaska's National Parks. University of Washington. 302 p. Dissertation.
- Womble, Peter; Johnson, Darryll; Bultena, Gordon; Field, Donald. 1980. The response of hikers to seeing resource impacts in the backcountry. Unpublished paper on file at: University of Washington, College of Forest Resources, Cooperative Park Studies Unit, Seattle, WA.
- Wright, William F. 1966. A study of land management and recreational users of the Mission Mountains Primitive Area, Montana 1964. Missoula: University of Montana. 121 p. Thesis.
- Young, James Mark. 1990. Identification of social indicators and standards for acceptable conditions in the Cohutta Wilderness using a normative social judgment approach. Blacksburg: Virginia Polytechnic Institute and State University. 212 p. Thesis.
- Young, Robert Allen. 1978. An analysis of wilderness concepts and values. Urbana: University of Illinois at Urbana-Champaign. 199 p. Dissertation.
- Zuckert, Judith A. 1980. Environmental and psychological determinants of campsite selection at a high Sierra lake. Fort Collins: Colorado State University. 72 p. Thesis.



The Rocky Mountain Research Station develops scientific information and technology to improve management, protection, and use of the forests and rangelands. Research is designed to meet the needs of National Forest managers, Federal and State agencies, public and private organizations, academic institutions, industry, and individuals.

Studies accelerate solutions to problems involving ecosystems, range, forests, water, recreation, fire, resource inventory, land reclamation, community sustainability, forest engineering technology, multiple use economics, wildlife and fish habitat, and forest insects and diseases. Studies are conducted cooperatively, and applications may be found worldwide.

Research Locations

Flagstaff, Arizona
Fort Collins, Colorado*
Boise, Idaho
Moscow, Idaho
Bozeman, Montana
Missoula, Montana
Lincoln, Nebraska

Reno, Nevada
Albuquerque, New Mexico
Rapid City, South Dakota
Logan, Utah
Ogden, Utah
Provo, Utah
Laramie, Wyoming

*Station Headquarters, Natural Resources Research Center,
2150 Centre Avenue, Building A, Fort Collins, CO 80526

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice or TDD). USDA is an equal opportunity provider and employer.