

A Systematic Review of the Psychological, Social, and Educational Outcomes Associated With Participation in Wildland Recreational Activities

W. Hunter Holland
Robert B. Powell
Clemson University

Jennifer M. Thomsen
University of Montana

Christopher A. Monz
Utah State University

Abstract

Participation in wildland recreation is associated with a range of individual-level outcomes. Although these outcomes have been extensively studied, few studies have systematically examined and summarized this empirical evidence. Therefore, the goals of this study include identifying (1) the breadth of individual-level outcomes associated with wildland recreation, (2) the setting and programmatic attributes that research suggests are driving these outcomes, and (3) the gaps in the peer-reviewed literature regarding the outcomes associated with wildland recreation. We systematically examined 235 articles published between 2000 and 2016 that evaluated the psychological, social, and educational outcomes associated with participation in wildland recreation. We identified 11 broad categories, the most common related to personal development (59%), pro-social behaviors (52%), mental restoration (42%), and environmental stewardship (36%). Results highlight gaps in our knowledge regarding outcomes and their potential causes. We conclude by discussing trends and implications for managers and future research.

KEYWORDS: wildland recreation; outcomes; environmental stewardship; personal development; outdoor recreation

Acknowledgments: The George B. Storer Foundation provided funding for this research.

In 1865, Frederick Law Olmsted suggested that recreating in natural areas had “lasting physical, mental, and moral effects” and “furthermore increased capacity for happiness” (Spirn, 1996, p. 93). Today, considerable research and advocacy organizations assert that participation in outdoor and wildland recreational activities can lead to physical, psychological, social, and educational outcomes (e.g., Ewert, 1989; Moore & Driver, 2005; Outdoor Foundation, 2017). However, what is the scientific support for whether individuals who participate in wildland recreation experience these outcomes?

Between the 1940s and 1960s, the United States saw tremendous growth in the visitation and use of the country’s outdoor recreation resources (Sellars, 1997). The American public, with increased expendable income and leisure time, demanded access to wildland recreational resources, such as national parks and national forests. In response to the growing demand for outdoor recreation in the United States, Congress created the Outdoor Recreation Resources Review Commission in 1958 to study the present and future needs for outdoor recreation and to determine the current and potential future supply of outdoor recreation resources (Betz, English, & Cordell, 1999; Douglass, 1999; Driver & Brown, 1986). In the 1960s, Congress passed several major legislative acts, including the Multiple-Use Sustained-Yield Act of 1960, the Wilderness Act, the Wild and Scenic Rivers Act, and the National Trails System Act, and formed a national recreation area system to meet this growing public demand for wildland recreational resources (Douglass, 1999). The creation of these new legislations triggered the development of research programs with the sole purpose of exploring the outdoor recreation phenomenon.

Many of these early outdoor recreation studies sought to understand the motivations, attitudes, and behaviors of the users of public lands, to improve land management practices (Burch, 1964; Douglass, 1999; National Advisory Council on Regional Recreation Planning, 1959; Outdoor Recreation Resources Review Commission, 1962; Wildland Research Center-University of California, 1962). In the 1970s, use of outdoor recreation resources continued to climb and precipitated increased research focusing on why people use natural environments for recreation (Knopf, 1983). Resource managers, in search of new ways to accommodate increasing visitation, hoped this research would provide an understanding of recreationists’ motivations and expectations.

These early motivational studies were devised for gaining insight into participants’ underlying intentions and desires for their outdoor recreation experience, as well as into the outcomes of outdoor recreation, wilderness use, and outdoor pursuits. Dr. Beverly Driver, one of the most prolific and influential investigators of outdoor and wildland recreation, investigated the motivation for and the outcomes derived from outdoor recreation participation (e.g., Driver, 1976; Driver & Bassett, 1977; Driver & Brown, 1986; Driver & Johnson, 1984). Driver, along with Perry Brown, Richard Knopf, John Hendee, and others, primarily sought to understand recreational motivations and their influence on choice of activity and setting (Brown & Haas, 1980; Hendee, 1974; Hendee, Gale, & Catton, 1971; Manfredi, Driver, & Tarrant, 1996). Their research suggested that participation in wildland recreation has the potential to produce a range of positive or negative cognitive, psychosocial, and behavioral outcomes (Ewert, 1989; Kellert, 1998). But while the physical outcomes of participation are generally more obvious and easily measured, the educational, psychological, and social outcomes appear to be supported by only anecdotal evidence, with few studies utilizing a longitudinal approach (Kellert, 1998). The few longitudinal studies include Kellert’s examination of wildland experiences provided by the outdoor education organizations Student Conservation Association, National Outdoor Leadership School, and Outward Bound (Kellert, 1998) and the Kaplans’ 10-year Outdoor Wilderness Challenge study (Kaplan, 1984; Kaplan & Kaplan, 1989). Each of these studies highlighted the potential outcomes of participation in an organized and facilitated wilderness program. These studies, while focused on a select population, also suggest that any wildland recreational pursuit or nature-based tour has the potential to produce long-lasting and significant changes in individual participants,

although these outcomes will vary across a spectrum depending on the individual and the experience qualities.

However, with changing U.S. demographics, the emergence of new wildland recreational activities, and changes in the public's social and recreational preferences such as increased use of technology (Kellert, 2005; Louv, 2005; Moore & Driver, 2005), what continues to be unclear are the breadth of these potential positive outcomes, the level of support in the literature, what aspects of the outdoor/wildland recreational experience result in personal outcomes, and the current gaps in our knowledge. Thus, the primary objectives of this study included summarizing the more recent peer-reviewed scientific literature to (1) identify the breadth of individual-level outcomes associated with wildland recreation, (2) identify setting and programmatic attributes that research suggests are driving these outcomes, and (3) identify gaps in our knowledge regarding the outcomes associated with wildland recreation.

Method

To clearly define wildland recreation for this study, we used Hammitt, Cole, and Monz's (2015) definition of wildland recreation:

Recreational activities conducted outdoors in wildland areas that are dependent on the natural resources of that area . . . Moreover, these wildland settings are largely natural, and management strives to maintain a natural appearance. Facilities are limited in area extent and function. Facilities are limited, if present at all, and are more likely to enhance visitor safety and resource protection than visitor comfort or convenience . . . Finally, use tends to be dispersed, creating a social environment with less emphasis on certain types of social interaction. Interaction takes place in small groups with less interparty contact. (pp. 3–5)

We further limited the scope of our work to focus on nonmotorized wildland recreational activities. We included dispersed private outings and sponsored activities offered by professional organizations, tour operators, nonprofits, and educational institutions. Our definition of wildland recreation also encompasses terms such as *outdoor recreation*, *wilderness recreation*, *ecotourism*, *adventure-based recreation*, *experiential education*, and *outdoor play in wildland settings*. In addition, we focused on the potential psychological, social, and educational outcomes individuals, whether adult, youth, or child, may derive from participating in a wildland recreational experience. We excluded articles that exclusively focused on physical and mental health outcomes, because we conducted another analysis focused exclusively on these physical and mental health outcomes associated with outdoor and wildland recreation (see Thomsen, Powell, & Monz, 2018). However, if an article included physical or mental health in addition to other individual benefits (Table 1), we included it in the analysis.

Article Selection

To perform a systematic analysis of peer-reviewed literature related to the outcomes of wildland or outdoor recreation, we followed methods used by Skibins, Powell, and Stern (2012), and Stern, Powell, and Hill (2014), who adapted steps recommended by Salkind (2009) including collecting a representative group of studies, designating a coding structure for investigating outcomes for comparison across studies, and developing a series of descriptive techniques, to summarize the studies as a whole. Specifically, we systematically identified peer-reviewed journal articles written between 2000 and 2016 that explicitly examined a wildland recreational activity; aimed to measure psychological, social, and/or educational outcomes derived from participation in an outdoor recreation activity; and provided enough details regarding the methods to ascertain that an empirical assessment occurred.

To identify articles for this systematic review, we first read all published abstracts between 2000 and 2016 from the *Journal of Outdoor Recreation, Education, and Leadership*; *Journal of Leisure Research*; *Journal of Outdoor Recreation and Tourism*; *Journal of Research in Outdoor Education*; *Journal of Adventure Education and Outdoor Learning*; *Journal of Experiential Education*; and *Journal of Leisure Sciences*. This review produced 84 articles that met our criteria. To further expand our sample size, we reviewed the literature cited in the initial 84 articles to identify additional studies that met our criteria, and we investigated the articles that cited the original 84 articles. We also used keyword searches (*outdoor recreation, outdoor education, wilderness, adventure recreation, outdoor play, experiential education, wilderness recreation, wild nature recreation, wildland recreation*) in Google Scholar and Web of Science. We identified 605 potential articles during our keyword search; ultimately after a thorough review of these 605 articles, an additional 151 articles met our criteria for inclusion. Thus, we identified 235 articles from 62 journals for this systematic review. Articles excluded by our criteria included editorials, scale development efforts, theory papers, and those that did not directly investigate the outcomes of wildland recreation.

Article Coding

To identify the outcomes associated with wildland recreation, we followed a four-step process. First, we referred to Ewert's (1989), Kellert's (1998), Moore and Driver's (2005), and Driver's (1976) previous identification of outcomes associated with participation in wildland recreational activities to identify the potential outcomes, whether positive, neutral, or negative. We then read a sample of articles and conducted a content analysis, which allowed us to code articles into multiple categories (all that were deemed present, as well as whether outcomes were positive, null or neutral, or negative in nature). If a new outcome was identified, we added this to our categories and continued until we had reached saturation (no new outcomes were identified). Second, we reviewed these coding categories and developed corresponding operational definitions to provide clear guidance in coding. Third, three researchers coded a subsample of the articles independently without knowledge of each other's assigned codes. During this step, we then compared coding and reviewed areas of discrepancy until reaching final consensus. During a qualitative analysis, two or more researchers often perform an independent analysis of the data, like what we used in this study to increase the validity of the results (Creswell, 2007). Fourth, we coded all the articles for outcomes using the final agreed upon coding scheme.

We coded each of the 235 articles for type of recreational activity; age, gender, ethnicity, and group size of recreational participants; duration and location of activity; the method through which data were collected; and associated outcomes. Because wildland recreation has the potential of producing positive, neutral (null), or negative outcomes in individuals (e.g., Kellert, 1998), we coded these outcomes accordingly based on the results of the studies in question. Several articles assessed more than one recreational activity, outcome, and/or age range of participants and used multiple research methods. Thus, we coded for all characteristics and outcomes that were present.

Finally, we also reviewed papers to examine if the authors *explicitly* explored whether any characteristics of the wildland recreational experience contributed to the delivery of outcomes and coded these data using an open coding scheme (no preconceived categories) following recommendations by Creswell (2007). This allowed us to identify characteristics of the wildland recreational experience supported by qualitative or quantitative inquiry as important for delivering positive outcomes.

Operational Definitions of Outcomes

We identified 235 articles from 62 journals for the systematic review. From the 235 articles, we identified 69 unique outcomes and then grouped them into 11 overarching categories: desired lifestyle change, place attachment, spirituality, academic interest and performance, outdoor recreation interests and skills, new perspective, environmental stewardship, mental restoration, pro-social behaviors, personal development, and physical health and well-being (Table 1).

Table 1

Outcome Categories and Definitions

Category	Definition	Related concepts and keywords
Desired Lifestyle Change	The development of new goals in relation to one's habits, values, routines, and attitudes (e.g., Eagan, 2004)	Desire to meet physical needs, desire for more personal time, desire to spend more time outdoors, desire to pursue more outdoor activities, desire to establish relationships
Place Attachment	One's attached meaning to a designated social, psychological, or physical location (e.g., Coble et al., 2003).	Enhanced appreciation of location, place attachment, place dependence
Spirituality	Developing an enhanced sense of spirituality, religiosity, sense of awe, or flow (e.g., Csikszentmihalyi, 1990; Maslow, 1964; Powell et al., 2012; Powell et al., 2016)	Spiritual/awe experiences, transcendence, flow, peak experience, religious conviction/spiritual practice
Academic Interest and Learning	Increased desire to learn and pursue academic subjects and to improve academic performance	Interest in learning, academic self-efficacy, interest in self-directed learning, transference
Outdoor Recreation Interests and Skills	A desire to advance one's competency and ability in wildland recreational activities (e.g., Boyes & Potter, 2015)	Improving outdoor skills, problem-solving skills, exploration, identifying risk, development of judgment, decision making in outdoor settings, innovation
New Perspectives	Change in or development of an attitude toward or a way of regarding something; a point of view (e.g., Beeco, 2012)	Acceptance of diversity, diversify activities/hobbies/goals, novelty, responsibility for own needs, value in simplicity, opportunity, change in perspective, change in career goals, resistance to gender stereotypes, increased appreciation of comforts, gender sensitization

Table 1 (cont.)

Category	Definition	Related concepts and keywords
Environmental Stewardship	Responsible use and protection of natural resources and landscapes via sustainable practices (e.g., Hutson & Bailey, 2008; Vagias & Powell, 2010)	Connection to nature, connection with outdoors, environmental awareness/biocentric value, pro-environmental intentions, environmental actions, environmental concern, ecological literacy, environmental ethics/Leave No Trace, environmental preferences
Mental Restoration	Improved psychological and emotional well-being (e.g., Pohl et al., 2000)	Relaxation, fun, enjoyment, happiness, mindfulness, decreased stress, self-expression, satisfaction, liberation, freedom, reflection, emotional well-being, decreased depression
Pro-Social Behaviors	Improved social intelligence and social skills that enhance social interactions and relationships (e.g., Bailey & Kang, 2015)	Group cohesion, social engagement, emotional intelligence, social functioning, responsibility for others, expedition behavior, empathy, teamwork, cooperation, decreased social anxiety
Personal Development	Improved personal awareness and identity, improved personal skills such as positive youth development and character development outcomes (e.g., Whittington & Budbill, 2013)	Self-discovery, creativity, identity development, leadership, self-respect and meaningfulness, self-awareness, goal achievement, perseverance, self-improvement, self-efficacy, self-reliance, resilience, motivation/inspiration, increased motivation
Physical Health and Well-Being	Improved physical health, fitness, and well-being	Increased fitness, physical function, mental health

Results

Wildland Recreational Activities and Participants

Paddling sports (33.5%), hiking (30.9%), camping (25.4%), and backpacking (23.7%) were the most frequently studied wildland recreational activities in our sample of articles (Table 2). Of the articles, 31% focused on unique activities that did not fit under the other activity categories. These activities included survival skills and campfire programs (Garner, Taft, & Stevens, 2015), snorkeling (S. Larson, Farr, Stoeckl, Chacon, & Esparon, 2014), snowshoeing and Nordic walking (Korpela, Borodulin, Neuvonen, Paronen, & Tyrvaänen, 2014), running down sand dunes (Cumming & Nash, 2015), practicing bushcraft (Hinds, 2011), and sailing (D'Amato & Krasny, 2011), among others. Approximately 34.7% of the articles investigated independent recreationists, or those wildland recreationists who freely chose to undertake an activity alone or with friends without professional support (Table 3). These recreationists commonly included park visitors, trail hikers, or white-water kayakers. An example of an article that examined dispersed recreationists and their experiences with flow is Houge, Hodge, and Boyes's (2010) study of river surfers. The other 65.1% of articles focused on recreationists who

participated in programs organized, facilitated, or led by a professional or educational organization or institution. Approximately 31.4% of the articles investigated the influence of wildland recreational programs provided by professional outdoor organizations. These organizations included the National Outdoor Leadership School (NOLS; 10.2%), Outward Bound (6.4%), and the Wilderness Education Association (1.7%), among others. Additionally, most studies (79.2%) focused on adult wildland recreationists (Table 4). Of the 235 articles, 71 articles (30.12%) did not indicate the gender of their sample. In the articles that identified gender percentages of their study subjects, approximately 43.6% were mostly male-dominated groups (Table 5). Similarly, approximately 65% of articles did not report the ethnicity of the participants. In the articles that reported ethnicity, most were White or Caucasian. Last, approximately half of these studies occurred in North America (Table 6).

Table 2
Wildland Recreational Activities

Activity description	# of articles (<i>n</i> = 235)	%
Paddling Sports	79	33.5
Sea Kayaking	28	11.9
Canoeing	40	16.9
White-Water (rafting/kayaking/canoeing)	30	12.7
Hiking	73	30.9
Night Hiking	4	1.7
Camping	60	25.4
Backpacking	56	23.7
Rock Climbing	49	20.8
Rappelling	6	2.5
Mountaineering	23	9.7
Mountain Biking	20	8.5
Skiing and Snowboarding	20	8.5
Orienteering	18	7.6
Wildlife Watching	17	7.2
Solo	19	8.1
Swimming	11	4.7
Outdoor Play	10	4.2
Caving	6	2.5
Surfing	6	2.6
Canyoneering	6	2.6
Emerging Activities	1	0.4
Educational Programs	1	0.4
Other	72	31.0

Note. Percentage adds up to more than 100% because articles (programs) may have addressed more than one activity.

Table 3
Providers of Wildland Recreational Activities

Provider	# of articles (n = 235)	%
Organized Programs	150	65.1
Professional Organization	74	31.4
Outward Bound	15	6.4
National Outdoor Leadership School	24	10.2
Wilderness Education Association	4	1.7
Other	32	13.6
Educational	55	23.3
Commercial/Ecotourism	22	9.5
College Outdoor Programs	19	8.1
Summer Camp	15	6.4
Therapeutic Recreation	10	4.2
Independent Recreationists	82	34.7

Table 4
Age Ranges of Recreationists

Age	# of articles (n = 235)	%
Child (4–12)	24	10.2
Youth (13–17)	66	28.0
Adult (18+)	187	79.2

Table 5
Gender of Samples

Gender	# of articles (n = 235)	%
Mostly Male	103	43.6
Mostly Female	55	23.3
Roughly Equal Gender Distribution	7	3.0
Not Reported	71	30.1

Table 6
Location of Studies

Location of study	# of articles (n = 235)	%
Africa	3	1.3
South America	4	1.7
Asia	13	5.5
Australia	13	5.5
Europe	21	8.9
North America	111	47.0
No Location Reported	64	27.1

Methods Used by Researchers

The examined studies were predominantly qualitative (41.5%) in nature; 32.6% of the studies were quantitative in nature and used tools such as surveys and other techniques to collect data. Of the studies, 25.8% employed mixed methods, and 29.7% used a pre- and post-experience design to ascertain outcomes. Most (67.8%) of the studies assessed outcomes immediately following the program, and only 11.4% of the studies did some form of follow-up to confirm whether participation had a more lasting impact on wildland recreationists. The most common techniques for data collection were questionnaires (73.7%) and interviews (44.5%; Table 7).

Of the studies, 38.7% utilized a sample size of less than 50 participants, 14% had between 51 and 100, 6% had between 101 and 150, and over 39% had more than 150. Finally, in the articles reviewed, 9% had response rates of 50% or lower, 26% had rates of 51% to 100%, and just over 59% did not report a response rate. This figure may be inflated because of qualitative and small sample studies, which we may assume had 100% response rates, but we only reported rates that were explicitly reported.

Table 7
Method for Data Collection

Design	# of articles (<i>n</i> = 235)	%
Methodology		
Qualitative	98	41.5
Quantitative	77	32.6
Mixed	61	25.8
Measurement Used		
Questionnaire	174	73.7
Interview	105	44.5
Follow-Up	35	14.8
Focus Group	18	7.6
Observation	18	7.6
Journaling	14	5.9
Video	11	4.7
Photo Elicitation	9	3.8
Reflection Paper	4	1.7
Peer Evaluation	1	0.4
Social Network Analysis	1	0.4
Research Design		
Post-Only Test	160	67.8
Pre-Post Test	70	29.7
Longitudinal	27	11.4

Outcomes

From the 235 articles, we identified 69 unique outcomes and then placed them into 11 overarching categories (Table 8). Of the 11 outcome categories, *personal development* (59.3%) and *pro-social behaviors* (52.1%) were the most commonly studied. For example, Marsh and Bobilya

(2013) studied personal development and pro-social behaviors, including a sense of fulfillment and connection to others, in backcountry skiers at Teton Pass, Wyoming. *Desired lifestyle change* (4.7%) and *place attachment* (9.7%) were examined the least. Only 18 (8%) of the 235 articles reported results that had no effect on the outcome and only 12 (5%) of the 235 articles reported a negative influence. The following sections discuss more details regarding the 11 outcome categories and their subcategories.

Table 8*Outcome Categories*

Outcome of wildland recreation	# of articles (n = 235)^a	%^{b, c}	Positive	Negative	Neutral
Desired Lifestyle Change	11	4.7	11	0	0
Place Attachment	23	9.7	22	1	0
Spirituality	30	12.7	30	0	0
Academic Interest and Performance	42	18.1	41	1	0
Outdoor Recreation Interests and Skills	61	25.8	61	0	0
New Perspectives	63	26.6	61	2	0
Environmental Stewardship	85	36.0	82	3	0
Mental Restoration	99	41.9	99	0	0
Pro-Social Behaviors	123	52.1	122	1	0
Personal Development	140	59.3	140	0	0
Physical Health and Well-Being	33	14.0	33	0	0

^aCount exceeds 235 due to articles with more than one evaluated outcome. ^bPercentage calculated on $n = 235$. ^cPercentage calculated on total number of times outcome was evaluated.

Desired Lifestyle Change

Five percent of the articles investigated the influence of wildland recreation on changes in lifestyle (Table 9). An example of an article that examined an increased desire for more personal time, attending physical needs, spending time outdoors, and seeking new challenges is Daniel, Bobilya, Kalisch, and Lindley's (2010) study on outcomes associated with participating in an Outward Bound solo experience.

Table 9*Outcomes Categorized Under Desired Lifestyle Changes*

Desired Lifestyle Change outcome	# of articles (n = 11)^a	%^{b, c}	Positive	Negative	Neutral
Desire to Meet Physical Needs	4	1.7	4	0	0
Desire for More Personal Time	8	3.4	7	0	1

^aCount exceeds 11 due to articles with more than one evaluated outcome. ^bPercentage calculated on $n = 235$. ^cPercentage calculated on total number of times outcome was evaluated.

Place Attachment

Approximately 10% of the articles investigated the influence of wildland recreation on the development of place attachment (Table 10), defined as the development of an appreciation, connection, and compassion—often social, economic, physical, and cultural in nature—for a geographic location (Ardoin, 2006). An example includes Cumming and Nash's (2015) study that found that students in an Australian forest school developed an attachment to the wilderness setting that provided elements of peace, pride, happiness, and calmness.

Table 10
Place Attachment

Place Attachment	# of articles (<i>n</i> = 23) ^a	%	Positive	Negative	Neutral
Place Attachment	23	9.7	22	1	0

^aCount exceeds 23 due to articles with more than one evaluated outcome.

Spirituality

Thirteen percent of the articles investigated the influence of wildland recreation on participants' spirituality such as sense of religiosity, awe, or flow (Table 11). Tsaur, Yen, and Hsiao's (2013) study noted that mountain climbers in Taiwan reported transcendent peak experiences and flow after participation. The most prevalent spiritual outcome reported and investigated was a feeling of awe (16 articles, 6.8%). Another 13 articles examined the occurrence of flow, or a complete focus on task where time slows and the self, action, and awareness merge (Csikszentmihalyi, 1990).

Table 11
Outcomes Categorized as Spirituality

Spirituality outcome	# of articles (<i>n</i> = 30) ^a	% ^{b, c}	Positive	Negative	Neutral
Religious Conviction/Spiritual Practice	2	0.8	2	0	0
Transcendence	3	1.3	3	0	0
Peak Experience	5	2.1	5	0	0
Flow	13	5.5	13	0	0
Spiritual/Awe Experiences	16	6.8	16	0	0

^aCount exceeds 30 due to articles with more than one evaluated outcome. ^bPercentage calculated on *n* = 235. ^cPercentage calculated on total number of times outcome was evaluated.

Academic Interest and Performance

Eighteen percent of the articles investigated the influence of wildland recreation on academic interest, performance, and learning (Table 12). Of the articles, 7.68% indicated that participants transferred what they learned during a wildland recreational experience and applied their learning to a new situation or context. For example, Widmer, Duerden, and Taniguchi (2014) found that teens who participated in a 2-week backpacking, white-water rafting, and

wilderness exploration program displayed an increase in positive academic efficacy, attitudes, and motivations postexposure. Of the articles, 6.49% reported that participants increased self-directed learning, and 3.5% found increased academic self-efficacy.

Table 12*Academic Interests and Performance/Learning*

Academic Interests and Performance/Learning outcome	# of articles (n = 42)^a	%^{b,c}	Positive	Negative	Neutral
Academic Self-Efficacy	8	3.5	8	0	0
Self-Directed Learning	16	6.39	15	1	0
Transference of Knowledge to New Situations	18	7.68	18	0	0

^aCount exceeds 42 due to articles with more than one evaluated outcome. ^bPercentage calculated on $n = 235$. ^cPercentage calculated on total number of times outcome was evaluated.

Outdoor Recreation Interests and Skills

Twenty-six percent of the articles investigated the influence of wildland recreation on participants' outdoor recreation interests and skills (Table 13). One example is Schmalz, Kerstetter, and Kleiber's (2011) study that found girls ages 10 to 18 developed physical and technical skills associated with activity while participating in canoeing and free-choice-oriented wilderness activities. Of the articles, 22.5% identified an increase in recreational skills (physical and technical skills associated with activity), 4.2% found the development of judgment and decision making in wilderness settings, and 2.5% stated that participation led to an increase in problem-solving skills associated with the wilderness activity.

Table 13*Outdoor Recreation Interests and Skills*

Outdoor Recreation Interests and Skills outcome	# of articles (n = 61)^a	%^{b,c}	Positive	Negative	Neutral
Identifying Risk	3	1.3	3	0	0
Problem-Solving Skills (in setting)	6	2.5	6	0	0
Development of Field Judgment and Decision Making	10	4.2	10	0	0
Hard Skills	53	22.5	53	0	0

^aCount exceeds 61 due to articles with more than one evaluated outcome. ^bPercentage calculated on $n = 235$. ^cPercentage calculated on total number of times outcome was evaluated.

New Perspectives

Approximately 28% of the articles investigated the influence of wildland recreation on developing new perspectives (Table 14). Of the articles, 17.8% reported that participants experienced a novel or new experience, which enriched their lives. Another 6.4% of the articles reported that recreating with people with diverse ethnicity and genders helped participants

overcome stereotypes and heightened the respect and appreciation of diversity. One example is Whittington's (2006) study, in which girls ages 13 to 18 who participated in a 23-day canoe expedition and were interviewed 5 and 18 months following their expedition changed their perspective of gender roles and ideal images of beauty in females.

Table 14
New Perspectives

New Perspectives outcome	# of articles (n = 63)^a	%^{b,c}	Positive	Negative	Neutral
Appreciation of Simplicity	3	1.3	3	0	0
Change in Career Goals	4	1.7	4	0	0
Appreciation of Comforts	8	3.4	8	0	0
Diversity and Gender	15	6.4	13	1	1
Diversify Activities/Hobbies/Goals	10	4.2	10	0	0
Novelty/Experiencing Something New and Novel	42	17.8	41	1	0

^aCount exceeds 63 due to articles with more than one evaluated outcome. ^bPercentage calculated on $n = 235$. ^cPercentage calculated on total number of times outcome was evaluated.

Environmental Stewardship

Thirty-six percent of the articles investigated the influence of wildland recreation on participants' level of environmental stewardship (Table 15). For example, Marchand's (2014) study found that college students who participated in outdoor recreation courses demonstrated increased pro-environmental attitudes compared to students who did not participate in outdoor recreation courses. In addition, studies suggest that participation in wildland recreation increases participants' connection to nature (18.6%), environmental awareness (13.9%), and environmental concern (4.6% of articles).

Table 15
Environmental Stewardship

Environmental Stewardship outcome	# of articles (n = 85)^a	%^{b,c}	Positive	Negative	Neutral
Environmental Ethics/Leave No Trace	4	1.7	4	0	0
Environmental Literacy	5	2.1	5	0	0
Environmental Preferences	12	5.1	12	0	0
Environmental Concern	11	4.6	9	2	0
Environmental Stewardship/Actions	15	6.4	15	0	0
Environmental Awareness+Intentions	33	13.9	31	0	2
Connection to Nature	44	18.6	43	1	0

^aCount exceeds 85 due to articles with more than one evaluated outcome. ^bPercentage calculated on $n = 235$. ^cPercentage calculated on total number of times outcome was evaluated.

Mental Restoration

Forty-two percent of the articles investigated the influence of wildland recreation on participants' mental restoration. An example of an article that reported increased mental restoration is Duvall and Kaplan's (2014) study that found that veterans who had participated in a white-water rafting, canoeing, and backpacking program demonstrated decreased perceived stress and increased ability to mentally focus. About 19% of the articles indicated that participants experienced relaxation, fun, and enjoyment, and another 6.8% of the articles reported increased mindfulness (Table 16).

Table 16
Mental Restoration

Mental Restoration outcome	# of articles (n = 99)^a	%^{b, c}	Positive	Negative	Neutral
Decreased Depression	3	1.3	3	0	0
Self-Expression	3	1.3	3	0	0
Satisfaction	6	2.5	6	0	0
Emotional Well-Being	6	2.5	6	0	0
Decreased Stress	9	3.8	9	0	0
Liberation/Freedom	9	3.8	9	0	0
Reflection	9	3.8	9	0	0
Tranquility	9	3.8	9	0	0
Breaking Mental Barriers	10	4.2	10	0	0
Autonomy	10	4.2	10	0	0
Mindfulness	16	6.8	16	0	0
Restoration	57	24.2	57	0	0
Enjoyment	45	19.1	45	0	0

^aCount exceeds 99 due to articles with more than one evaluated outcome. ^bPercentage calculated on $n = 235$. ^cPercentage calculated on total number of times outcome was evaluated.

Pro-Social Behaviors

Fifty-two percent of the articles investigated the influence of wildland recreation on the participants' pro-social behaviors (Table 17). An example of an article that found increased pro-social outcomes is Boniface's (2006) study that found that women who participated in adventurous wildland recreational activities such as caving, trekking, rock climbing, and winter climbing established relationships, developed group cohesion, and received a sense of social support within a group, among other pro-social outcomes. Of the articles, 25.8% indicated that participants enjoyed social engagements, 18.2% acknowledged establishing relationships as an outcome, and 13.6% indicated that participants experienced group cohesion. Five articles, including Furman and Sibthorp's (2011), examined the influence of participating in NOLS courses on "expedition behaviors," which is an overarching concept similar to pro-social behaviors and includes elements of leadership, selflessness, teamwork, and social intelligence.

Table 17
Pro-Social Behaviors

Pro-Social Behaviors outcome	# of articles (n = 123)^a	%^{b, c}	Positive	Negative	Neutral
Decreased Social Anxiety	2	0.8	2	0	0
Expedition Behavior	5	2.1	5	0	0
Emotional Intelligence/Social Functioning	6	2.5	6	0	0
Responsibility for Others/Focus on Others	6	2.5	6	0	0
Cooperation	7	3.0	7	0	0
Relationship Enrichment/Family Strength	7	3.0	7	0	0
Social Support	9	3.8	9	0	0
Empathy	10	4.2	10	0	0
Teamwork/Team Building/Group Success/Efficiency	20	8.4	18	1	1
Sense of Community	20	8.4	20	0	0
Group Cohesion/Family Cohesion	32	13.6	32	0	0
Establishing Relationships	43	18.2	39	0	0
Social Engagement	61	25.8	61	0	0

^aCount exceeds 123 due to articles with more than one evaluated outcome. ^bPercentage calculated on $n = 235$. ^cPercentage calculated on total number of times outcome was evaluated.

Personal Development

Approximately 60% of the articles investigated the influence of wildland recreation on participants' personal development. One example is McKenzie's (2003) study that found that Outward Bound participants received a heightened sense of goal achievement, the development of personal responsibility, increased leadership skills, and improved problem solving. Of the 235 articles, 35.5% suggested that wildland recreation was useful for self-discovery, 34.8% focused on overcoming challenge and pushing one's comfort zone, and 20.3% reported that increased self-respect was associated with participation in wildland recreation (Table 18).

Table 18
Personal Development

Personal Development outcome	# of articles (n = 140)^a	%^{b, c}	Positive	Negative	Neutral
Personal Control	2	0.8	2	0	0
Self-Efficacy	8	3.4	7	0	1
Resilience	9	3.8	8	0	1
Increased Quality of Life	10	4.2	10	0	0

Table 18 (cont.)

Personal Development outcome	# of articles (n = 140)^a	%^{b,c}	Positive	Negative	Neutral
Self-Reliance	16	6.7	14	0	2
Increased Motivation	19	8.0	18	1	0
Problem Solving, Decision Making, Etc.	26	11.0	26	0	0
Leadership	27	11.4	27	0	0
Goal Achievement	32	13.5	30	1	1
Self-Respect	48	20.3	46	1	1
Challenge/Perseverance/ Overcoming Adversity	82	34.8	79	0	3
Self-Discovery	84	35.5	82	1	1

^aCount exceeds 140 due to articles with more than one evaluated outcome. ^bPercentage calculated on $n = 235$. ^cPercentage calculated on total number of times outcome was evaluated.

Physical Health and Well-Being

Approximately 14% of the articles examined social, psychological, and other nonphysical health outcomes, as well as physical health outcomes associated with wildland recreation. About 11% of the articles reported that participants increased their physical activity levels. An example is Whittington and Budbill's (2013) study that found that adolescent girls ages 11 to 16 who participated in a mountain biking program experienced increased physical activity and positive body image. Of the articles, 3.4% stated that the participants tested their physical capabilities, and 2.1% identified improved body image as an outcome of participation in wildland recreation (Table 19).

Table 19

Physical Health and Well-Being

Physical Health and Well-Being outcome	# of articles (n = 33)^a	%^{b,c}	Positive	Negative	Neutral
Improved Body Image	5	2.1	5	0	0
Endurance/Testing Physical Capabilities	8	3.4	8	0	0
Increased Physical Activity	26	11.0	26	0	0

^aCount exceeds 33 due to articles with more than one evaluated outcome. ^bPercentage calculated on $n = 235$. ^cPercentage calculated on total number of times outcome was evaluated.

Independent Versus Programmed Wildland Recreation

Articles that studied independent recreationists (34.7%) most often studied the development of environmental stewardship and pro-environmental behaviors (51.8%) as an outcome. Personal development (50.6%) was second, mental restoration (49.4%) was third, and pro-social behaviors (40.7%) was fourth. Articles that studied professional outdoor organizations (65.1% of total) most often studied pro-social behaviors (67.1%), personal development (63.0%) and mental restoration (38.4%).

What Leads to These Outcomes?

Researchers have not only examined the outcomes associated with wildland recreation, but they are also beginning to uncover why these outcomes may be occurring (Table 20). We identified 27 articles from our sample of 235 articles in which the authors not only measured outcomes but also *explicitly* attempted through either qualitative or quantitative techniques to test, identify, or link these outcomes with attributes of the wildland experience to explain why outcomes may be occurring. These attributes of the wildland experience can be organized into the broad categories of environmental or setting characteristics, activity/program characteristics, leader characteristics, and participant characteristics (Powell, Brownlee, Kellert, & Ham, 2012; Powell, Kellert, & Ham, 2009; Powell, Ramshaw, Ogletree, & Krafte, 2016).

Researchers identified several aspects of the natural environment/setting as influential, including the uniqueness and novelty that wilderness settings provide recreationists and that allow for separation from the day-to-day built environment. This natural setting also provides distinct opportunities for reflection and challenge, which many participants and authors suggested were important for delivering positive outcomes. Many authors, however, focused on a general and holistic perspective regarding the importance of recreating in natural settings/wilderness for delivering outcomes (Table 20).

Researchers, especially those focused on wilderness programs provided by professional organizations such as NOLS and Outward Bound, also investigated the contribution of programmatic and social characteristics of these wildland recreational experiences. These included the influence of group dynamics and social learning on outcomes, especially because most wildland recreationists travel in social groups. Others also investigated dosage, or the duration of a wildland experience on outcomes, and found that the duration of immersion was an important predictor of many outcomes. Last, several researchers examined group sizes, and this research suggests that larger group sizes may inhibit the delivery of outcomes.

Researchers also examined the influence of trip leaders and guides on the delivery of outcomes. The results suggest the importance of well-trained leaders who can provide effective interpretation and group facilitation to maximize the outcomes of participants. Last, it is important that the characteristics of the wildland recreationist also influence what outcomes an individual will derive from the experience. These attributes include their self-assessed knowledge, attitudes toward the environment, and motivations for participation.

Table 20
Characteristics of the Wildland Experience Leading to Outcomes

Characteristic	# of articles	Outcomes associated with characteristic	Citation
Environmental			
Recreating in and Examining the Natural Environment	13	Personal development; pro-social behaviors; mental restoration; sense of place; outdoor recreation interests and skills; spirituality; mental health; sense of place; environmental stewardship; new perspective; academic interest and performance	Beeco et al., 2011 Bell & Holmes, 2011 Cole & Hall, 2009 D’Amato & Krasny, 2011 Furman & Sibthorp, 2013 Goldenberg & Soule, 2015 Houge et al., 2010 Houge Mackenzie & Kerr, 2016 Korpela et al., 2014 L. Larson et al., 2011 McAvoy et al., 2006 Paisley et al., 2008 Whittington, 2011

Table 20 (cont.)

Characteristic	# of articles	Outcomes associated with characteristic	Citation
Novelty of Environment: Immersion	3	Personal development outcomes; trust and belonging	Goldenberg & Soule, 2015 McAvoy et al., 2006
Wilderness: Source of Reflection	3	Spiritual-personal development; new perspective; outdoor recreation interests and skills; pro-social behaviors; mental restoration	Breunig et al., 2010 Daniel, 2010 Goldenberg & Soule, 2008 Goldenberg & Soule, 2015 Paisley et al., 2008
Wilderness: Source of Adversity	9	Personal development; spiritual-personal development; trust and belonging; new perspectives; outdoor recreation interests and skills; pro-social behaviors; physical health; sense of place; mental restoration; academic interest and performance; environmental stewardship	Bell & Holmes, 2011 Breunig et al., 2010 D'Amato & Krasny, 2011 Daniel, 2010 Gassner & Russell, 2008 Goldenberg & Soule, 2015 McAvoy et al., 2006 McKenzie, 2003 Paisley et al., 2008 Taniguchi et al., 2005
Trip/Social Characteristics			
Solo Experience	5	Personal development outcomes; leadership; stewardship; social outcomes; new perspectives; outdoor recreation interests and skills; spirituality; pro-social behaviors; physical health; sense of place	Gassner & Russell, 2008 Goldenberg et al., 2005 Goldenberg & Soule, 2015 McKenzie, 2003 Whittington, 2011
Social Learning	8	Trust and belonging; communitas; pro-social behaviors; new perspectives; outdoor recreation interests and skills; spirituality; personal development; pro-social behaviors; physical health; sense of place	Bell & Holmes, 2011 McKenzie, 2003 Paisley et al., 2008
Personal Reflection Time	3	Trust and belonging; communitas; transference of pro-social behaviors	Breunig et al., 2010 Gassner & Russell, 2008 Taniguchi et al., 2005
Goal Setting	1	Transference of pro-social behaviors	Breunig et al., 2010

Table 20 (cont.)

Characteristic	# of articles	Outcomes associated with characteristic	Citation
Social Interactions	14	New perspective; outdoor recreation interests and skills; personal development outcomes; pro-social behaviors; mental restoration; sense of place; academic interest and performance; spirituality; environmental stewardship; solitude; new perspective	Bell & Holmes, 2011 Breunig et al., 2010 Cole & Hall, 2009 D'Amato & Krasny, 2011 Daniel, 2010 Furman & Sibthorp, 2011 Gassner & Russell, 2008 Goldenberg et al., 2008 Goldenberg et al., 2005 Goldenberg & Soule, 2011, 2014a, 2014b, 2015 Houge Mackenzie & Kerr, 2016 Paisley et al., 2008
Adventure	4	Connection to nature; trust and belonging; new perspective; outdoor recreation interests and skills; personal development outcomes; pro-social behaviors; mental restoration; physical health; sense of place	Bell & Holmes, 2011 Goldenberg et al., 2008 Goldenberg et al., 2005 Houge et al., 2010
The Assignment and Completion of Daily Roles	4	Personal development outcomes; leadership; stewardship; social outcomes	Breunig et al., 2010 Furman & Sibthorp, 2011 Goldenberg & Soule, 2015 Whittington, 2011
Opportunities for Leadership	6	Personal development outcomes; leadership; stewardship; social; new perspectives; outdoor recreation interests and skills; spirituality; pro-social behaviors; physical health; sense of place	Furman & Sibthorp, 2011 Goldenberg & Soule, 2015 McKenzie, 2003 Mirkin, 2014 Paisley et al., 2008 Whittington, 2011
Duration	4	Environmental stewardship	Bell & Holmes, 2011 Breunig et al., 2010 Korpela et al., 2014 Powell et al., 2009
Number of People in Group (Negatively Associated With Outcomes)	5	Environmental stewardship; trust and belonging; new perspective; outdoor recreation interests and skills; personal development outcomes; pro-social behaviors; mental restoration; academic interest and performance; spirituality	Bell & Holmes, 2011 Goldenberg et al., 2008 Goldenberg, & Soule, 2014a Powell et al., 2009

Table 20 (cont.)

Characteristic	# of articles	Outcomes associated with characteristic	Citation
Leader			
Interpretation Amount and Quality	2	Environmental stewardship; personal development outcomes	Powell et al., 2009 Vagias & Powell, 2010
Leader Quality (Leadership, Facilitation, and Feedback Skills)	8	Environmental stewardship; personal development outcomes; trust and belonging; pro-social behavior; mental restoration; sense of place	Bell & Holmes, 2011 Furman & Sibthorp, 2011 Goldenberg & Soule, 2015 Houge Mackenzie & Kerr, 2016 McAvoy et al., 2006 McKenzie, 2003 Paisley et al., 2008
Participant			
Nonconsumptive: Appreciative Activities	5	Environmental stewardship; new perspectives; outdoor recreation interests and skills; spirituality; personal development; pro-social behaviors; physical health; sense of place; mental restoration	Goldenberg et al., 2008 Goldenberg et al., 2005 L. Larson et al., 2011 McKenzie, 2003 Thapa & Graefe, 2003
Knowledge	3	Environmental stewardship	L. Larson et al., 2011 Powell et al., 2009 Vagias et al., 2014
Attitudes	3	Environmental stewardship	L. Larson et al., 2011 Powell et al., 2009 Vagias et al., 2014

Discussion

The results from this review of 235 articles suggest that wildland recreation delivers a range of educational, psychological, and social outcomes to individuals—largely supporting results from studies conducted in the 1970s, 1980s, and 1990s. However, trends and gaps in the literature were also identified. These research trends include an emphasis on programmed wilderness and adventure recreation, and the gaps include a lack of studies with null and negative results, a lack of studies on diverse populations, and a lack of studies aimed at identifying programmatic elements that influence outcomes.

Emphasis on Programmed Adventure Recreation

Although a range of studies (e.g., Driver, 1976; Driver & Brown, 1986; Driver, Douglass, & Loomis, 1999; Ewert, 1989) historically have focused on the outcomes received by dispersed wildland recreationist, we found that in the last 16 years a majority (65%) of studies focused on programmed adventure recreation (programs provided by schools and professional organizations such as NOLS and Outward Bound). This focus on programmed adventure recreation has also led to studies investigating *personal development* and *pro-social behavior* outcomes, because

these organizations, such as NOLS and Outward Bound, seek to develop these in participants (e.g., Furman & Sibthorp, 2010, 2013). However, most recreationists choose to participate in wildland activities outside of organized programs (Outdoor Foundation, 2017; Outdoor Foundation, 2017). In the last 15 years, a new and diverse generation of wildland recreationists influenced by technological and equipment advances have emerged, each with potentially different needs, expectations, and desires. These wildland recreationists commonly include mountain bikers, hikers, climbers, and paddlers, among others, and land managers will need increased research to understand and effectively manage recreation resources for this new generation.

Lack of Null and Negative Results

A second trend in the literature is that few studies have reported null or negative results, which may reflect that wildland recreation is beneficial irrespective of outcome, activity, or participant, or alternatively that researchers are failing to report and publish nonsignificant or negative results. In our study, just over 10% of the studies identified negative or null findings. This suggests that researchers may be “shelving negative results” because of a perceived bias toward publishing “significant” results and a desire to advocate for a phenomenon (Fanelli, 2011; Knight, 2003), in this case wildland recreation.

Lack of Longitudinal Studies

Wildland recreational research appears to be dominated by cross-sectional studies that are measuring immediate outcomes (e.g., Goldenberg & Soule, 2014a) without investigating more long-term outcomes associated with participating in wildland recreation. This is particularly true regarding the dispersed wildland recreationist—but also in general—and few studies (11.6% of our identified articles; e.g., Goldenberg & Soule, 2015; Powell et al., 2009) have examined the more long-term outcomes associated with wildland recreational participation. This widespread use of cross-sectional studies is particularly problematic because research in this and related fields has consistently found positive and significant results in the short term, but many outcomes dissipate over time (e.g., Powell et al., 2009).

Lack of Diversity

Outdoor recreation activities, including wildland recreation, have been identified as predominantly serving White, male, heterosexual, able-bodied, and middle and upper class citizens (Warren, 2016). This lack of diversity in participants in wildland recreation influences not only how results are reported in studies of wildland recreation, but also their relevance for addressing the needs of an increasingly diverse U.S. public. For example, over the last 16 years, few studies have reported the racial demographics of their samples (e.g., African American, Hispanic, Asian). We can only assume that most of the samples were White dominated, but in fact we do not know. This also raises another question regarding if findings from these studies are generalizable to other diverse groups. Additionally, from the results of this review, it is apparent that we know little about which environmental, programmatic, and activity characteristics are preferred by diverse audiences or are most associated with enhancing outcomes.

Studies Identifying Programmatic Elements

In this study, we also identified articles that sought to examine the influence of characteristics of the wildland recreational experience on outcomes. We identified 27 articles that *explicitly* examined the linkages through either qualitative methods such as the end-means approach or quantitative techniques. Our review suggests that this research—examining the relative contributions of specific characteristics of the wildland experience to specific outcomes—is in its infancy; moreover, it remains unclear if the wildland setting is *necessary* for delivering outcomes.

There are several explanations for this low number of studies that have identified and clearly linked attributes of wildland recreation to outcomes. Some argue that wildland recreation is a complex experience and outcomes are shaped by an interaction between the participants, their associated characteristics and motivations, and the activity/program and site characteristics (e.g., Powell et al., 2012; Powell et al., 2009). Because the wildland recreational experience is multifaceted and complex, current research efforts have been largely exploratory and descriptive and have not explicitly identified the relative contribution of each component part of the wildland recreational experience.

Research in related fields suggests several environmental-setting characteristics that are important for outcomes such as a heightened spirituality and awe. These characteristics include the vastness of the landscape (e.g., Heintzman, 2010; Heintzman & Mannell, 2003; Koceni, 2005; Powell et al., 2016), opportunities for solitude (e.g., Gallagher, 1993; Williams & Harvey, 2001), extreme beauty (e.g., Powell et al., 2016), uniqueness/novelty (e.g., Powell et al., 2016; Reynolds & Braithwaite, 2001), perceived danger/inhospitable (e.g., Csikszentmihalyi, 1990; Powell et al., 2016), and the charisma of wildlife (e.g., DeMares, 2000; Skibins & Powell, 2013; Skibins, Powell, & Hallo, 2013). However, current research in wildland recreation has examined the setting more holistically and has not identified specific components and attributes.

When we examine outcomes related to personal development, environmental stewardship, pro-social behaviors, physical fitness, and well-being, the contribution of the wilderness setting becomes even less clear. Many research findings suggest that programs occurring in a host of built and or nature-proximate settings such as camps (e.g., Catalano, Berglund, Ryan, Lonczak, & Hawkins, 2002), gyms (e.g., R. Larson, 2000), classrooms (e.g., Durlak, Weissberg, & Pachan, 2010), and city parks can also deliver similar outcomes. To date, the specific contribution of the wilderness setting for delivering these psychological, social, educational, and physical outcomes has not been rigorously examined. Our analysis of this literature suggests that the specific role of a setting, whether in wildlands or other environments, is unclear, especially whether it is a requirement for delivering some of the aforementioned outcomes. Instead, the research suggests that the setting, whether wilderness or built in nature, may reflect a preference of the participant and may not be an essential element for delivering many outcomes.

The contributions of programmatic and leadership characteristics have also been examined in other fields, and there appears to be consensus regarding many of the important attributes that appear advantageous for enhancing desired outcomes. For example, research in business and other fields suggests that an effective leader is important for delivering outcomes and this leader needs to be skilled in facilitating teamwork and “(a) . . . in the areas of group process, collaborative problem solving, team development, active listening and conflict management; (b) [facilitating] learning as a process; and (c) modeling dispositional ideals,” including being non-dominating, friendly, empathetic, open to input, and inclusive (Edmondson, 2003; Kreske, 1996; Preskill & Torres, 1999; Willemyns, Gallois, & Callans, 2003). Future research examining wildland recreation, especially programmed activities and courses, should build on current efforts examining the unique contributions of wildland settings and should especially seek to identify why wilderness is different than other settings. This examination should also control for the relative contribution of the social group and interpersonal dynamics, which based on this review appear to be important for delivering outcomes, as well as the motivations and preferences of each participant.

Conclusion

Despite these trends and gaps in our knowledge, the overwhelmingly positive results in our systematic review of literature ultimately suggest that wildland recreation is beneficial for participants in a host of psychological, social, and educational ways. However, we propose that to advance the study of wildland recreation, more rigorous research begin to test this phenomenon

more completely. Researchers must place greater efforts toward understanding the long-term outcomes and the perspectives of an increasingly diverse public, as well as identifying how and why wildlands contribute to human well-being. Additionally, as participation and competition for access to public lands and other wildland recreational resources increase, additional research needs to refocus on the experiences of the dispersed wildland recreationist. The fact that wildland recreation continues to grow in popularity and is increasingly serving a more diverse public demonstrates that the American public values wildland recreation and receives benefits (e.g., Outdoor Foundation, 2017). Our role as researchers will be to continue to investigate wildland recreation, the associated outcomes, and why they may be occurring.

References

- Ardoin, N. M. (2006). Toward an interdisciplinary understanding of place: Lessons for environmental education. *Canadian Journal of Environmental Education, 11*(1), 112–126.
- Bailey, A. W., & Kang, H. K. (2015). Modeling the impact of wilderness orientation programs on first-year academic success and life purpose. *Journal of Adventure Education and Outdoor Learning, 15*, 209–223. <https://doi.org/10.1080/14729679.2014.949809>
- Beeco, J. A. (2012). Programming nighttime activities in outdoor adventure programs. *Journal of Outdoor Recreation, Education, and Leadership, 4*, 92–94. <https://doi.org/10.7768/1948-5123.1154>
- Beeco, J. A., Hallo, J. C., Baldwin, E. D., & McQuire, F. A. (2011). An examination of the guided night hiking experience in parks and protected areas. *Journal of Park and Recreation Administration, 29*(4), 72–88.
- Bell, B. J., & Holmes, M. R. (2011). Important factors leading to outdoor orientation program outcomes: A qualitative exploration of survey results. *Journal of Outdoor Recreation, Education, and Leadership, 3*(1), 26–39. <https://doi.org/10.7768/1948-5123.1075>
- Betz, C. J., English, D., & Cordell, H. K. (1999). Outdoor recreation resources. In H. K. Cordell (Ed.), H. K. Cordell (Principal Investigator), *Outdoor recreation in American life: A national assessment of demand and supply trends* (pp. 39–182). Champaign, IL: Sagamore.
- Boniface, M. (2006). The meaning of adventurous activities for ‘women in the outdoors.’ *Journal of Adventure Education and Outdoor Learning, 6*(1), 9–24. <https://doi.org/10.1080/14729670685200711>
- Boyes, M., & Potter, T. (2015). The application of recognition-primed decision theory to decisions made in an outdoor education context. *Australian Journal of Outdoor Education, 18*(1), 1–16. <https://doi.org/10.1007/BF03400975>
- Breunig, M. C., O’Connell, T. S., Todd, S., Anderson, L., & Young, A. (2010). The impact of outdoor pursuits on college students’ perceived sense of community. *Journal of Leisure Research, 42*, 551–572. <https://doi.org/10.1080/00222216.2010.11950218>
- Brown, P. J., & Haas, G. (1980). Wilderness recreation experiences: The Rawah case. *Journal of Leisure Research, 12*, 229–241. <https://doi.org/10.1080/00222216.1980.11969447>
- Burch, W. R. (1964). *Nature as symbol and expression in American social life: A sociological exploration*. Ann Arbor: University of Michigan.
- Catalano, R. F., Berglund, M. L., Ryan, J. A., Lonczak, H. S., & Hawkins, J. D. (2002). Positive youth development in the United States: Research findings on evaluations of positive youth development programs. *Prevention and Treatment, 5*(1). <https://doi.org/10.1037/1522-3736.5.1.515a>
- Coble, T. G., Selin, S. W., & Erickson, B. B. (2003). Hiking alone: Understanding fear, negotiation strategies, and leisure experience. *Journal of Leisure Research, 35*, 1–22. <https://doi.org/10.18666/jlr-2003-v35-i1-608>

- Cole, D. N., & Hall, T. E. (2009). Perceived effects of setting attributes on visitor experiences in wilderness: Variation with situational context and visitor characteristics. *Environmental Management*, 44(1), 24–36. <https://doi.org/10.1007/s00267-009-9286-8>
- Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (2nd ed.). Thousand Oaks, CA: Sage.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal performance*. New York, NY: Cambridge University Press.
- Cumming, F., & Nash, M. (2015). An Australian perspective of a forest school: Shaping a sense of place to support learning. *Journal of Adventure Education and Outdoor Learning*, 15, 296–309. <https://doi.org/10.1080/14729679.2015.1010071>
- D'Amato, L. G., & Krasny, M. E. (2011). Outdoor adventure education: Applying transformative learning theory to understanding instrumental learning and personal growth in environmental education. *Journal of Environmental Education*, 42, 237–254. <https://doi.org/10.1080/00958964.2011.581313>
- Daniel, B. (2010). Canvas, catalyst, crucible: Exploring the role of the setting in the wilderness expedition experience. *Journal of Outdoor Recreation, Education, and Leadership*, 2, 133–136. <https://doi.org/10.7768/1948-5123.1053>
- Daniel, B., Bobilya, A. J., Kalisch, K. R., & Lindley, B. (2010). Lessons from the Outward Bound solo: Intended transfer of learning. *Journal of Outdoor Recreation, Education, and Leadership*, 2, 37–58. <https://doi.org/10.7768/1948-5123.1032>
- DeMares, R. (2000). Human peak experience triggered by encounters with cetaceans. *Anthrozoos*, 13, 89–103. <https://doi.org/10.2752/089279300786999914>
- Douglass, R. (1999). History of outdoor recreation and nature-based tourism in the United States. In H. K. Cordell (Principal Investigator), *Outdoor recreation in American life: A national assessment of demand and supply trends* (pp. 15–24). Champaign, IL: Sagamore.
- Driver, B. L. (1976). Toward a better understanding of the social benefits of outdoor recreation participation. In *Proceedings of the Southern States Recreation Research Applications Workshop* (Gen. Tech. Rep. SE-9, pp. 163–189). Asheville, NC: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station.
- Driver, B. L., & Bassett, J. R. (1977). *Problems of defining and measuring the preferences of river recreationists*. In *Proceedings of the River Recreation Management and Research Symposium* (Gen. Tech. Rep. NC-28, pp. 267–272). St. Paul, MN: USDA Forest Service, North Central Forest Experiment Station.
- Driver, B. L., & Brown, P. J. (1986). Probable personal benefits of outdoor recreation. In *A literature review: President's Commission on Americans Outdoors* (pp. 63–70). Washington, DC: U.S. Government Printing Office.
- Driver, B. L., Douglass, R. W., & Loomis, J. B. (1999). Outdoor recreation and wilderness in America: Benefits and history. In H. K. Cordell (Principal Investigator), *Outdoor recreation in American life: A national assessment of demand and supply trends* (pp. 1–30). Champaign, IL: Sagamore.
- Driver, B. L., & Johnson, L. A. (1984). A pilot study of the perceived long-term benefits of the Youth Conservation Corps. *Journal of Environmental Education*, 15(2), 3–11. <https://doi.org/10.1080/00958964.1984.9942666>
- Durlak, J. A., Weissberg, R. P., & Pachan, M. (2010). A meta-analysis of after-school programs that seek to promote personal and social skills in children and adolescents. *American Journal of Community Psychology*, 45, 294–309. <https://doi.org/10.1007/s10464-010-9300-6>
- Duvall, J., & Kaplan, R. (2014). Enhancing the well-being of veterans using extended group-based nature recreation experiences. *Journal of Rehabilitation Research and Development*, 51, 685–696. <https://doi.org/10.1682/JRRD.2013.08.0190>

- Eagan, N. (2004). The meaning associated with the experience of a sea kayaking adventure among adults with visual impairment. In *Proceedings of the Fourth Social Aspects and Recreation Research Symposium* (pp. 97–104). San Francisco, CA: San Francisco State University, Department of Recreation and Leisure Studies.
- Edmondson, A. C. (2003). Speaking up in the operating room: How team leaders promote learning in interdisciplinary action teams. *Journal of Management Studies*, *40*, 1419–1452. <https://doi.org/10.1111/1467-6486.00386>
- Ewert, A. (1989). *Outdoor adventure pursuits: Foundations, models, and theories*. Scottsdale, AZ: Publishing Horizons.
- Fanelli, D. (2011). Negative results are disappearing from most disciplines and countries. *Scientometrics*, *90*, 891–904. <https://doi.org/10.1007/s11192-011-0494-7>
- Furman, N., & Sibthorp, J. (2010). The learning and transfer of prosocial behavior in adventure education: Effects of a treatment curriculum. *Journal of Outdoor Recreation, Education, and Leadership*, *2*, 147–151. <https://doi.org/10.7768/1948-5123.1056>
- Furman, N., & Sibthorp, J. (2011). The transfer of expedition behavior skills from the National Outdoor Leadership School to life post-course. *Journal of Outdoor Recreation, Education, and Leadership*, *3*, 87–90. <https://doi.org/10.7768/1948-5123.1103>
- Furman, N., & Sibthorp, J. (2013). The development of prosocial behavior in adolescents: A mixed methods study from NOLS. *Journal of Experiential Education*, *37*, 160–175. <https://doi.org/10.1177/1053825913489105>
- Gallagher, W. (1993). *The power of place: How our surroundings shape our thoughts, emotions, and actions*. New York, NY: Poseidon Press.
- Garner, M. A., Taft, E. D., & Stevens, C. L. (2015). Do children increase their environmental consciousness during summer camp? A comparison of two programs. *Journal of Outdoor Recreation, Education, and Leadership*, *7*, 20–34. <https://doi.org/10.7768/1948-5123.1238>
- Gassner, M. E., & Russell, K. C. (2008). Relative impact of course components at Outward Bound Singapore: A retrospective study of long-term outcomes. *Journal of Adventure Education and Outdoor Learning*, *8*, 133–156. <https://doi.org/10.1080/14729670802597345>
- Goldenberg, M., Cummings, J., & Pronsolino, D. (2008). A means-end study of outcome differences of females and males associated with Outward Bound and National Outdoor Leadership School. *Research in Outdoor Education*, *9*, 9–25.
- Goldenberg, M., McAvoy, L., & Klenosky, D. B. (2005). Outcomes from the components of an Outward Bound experience. *Journal of Experiential Education*, *28*, 123–146. <https://doi.org/10.1177/105382590502800206>
- Goldenberg, M., & Soule, K. (2011). How group experience affects outcomes from NOLS programs: A means-end investigation. *Journal of Experiential Education*, *33*, 393–397. <https://doi.org/10.1177/105382591003300414>
- Goldenberg, M., & Soule, K. E. (2014a). Examining the role of gender in longitudinal adventure education outcome attainment. *Journal of Unconventional Parks, Tourism, and Recreation Research*, *5*(2), 23–28.
- Goldenberg, M., & Soule, K. E. (2014b). Outcomes of hiking the Pacific Crest Trail. *Journal of Outdoor Recreation, Education, and Leadership*, *6*, 44–54.
- Goldenberg, M., & Soule, K. E. (2015). A four-year follow-up of means-end outcomes from outdoor adventure programs. *Journal of Adventure Education and Outdoor Learning*, *15*, 284–295. <https://doi.org/10.1080/14729679.2014.970343>
- Hammit, W. E., Cole, D. N., & Monz, C. A. (2015). *Wildland recreation: Ecology and management*. Chichester, United Kingdom: John Wiley and Sons.
- Heintzman, P. (2010). Nature-based recreation and spirituality: A complex relationship. *Leisure Sciences*, *32*, 72–89. <https://doi.org/10.1080/01490400903430897>

- Heintzman, P., & Mannell, R. C. (2003). Spiritual functions of leisure and spiritual well-being: Coping with time pressure. *Leisure Sciences, 25*, 207–230. <https://doi.org/10.1080/01490400306563>
- Hendee, J. C. (1974). A multiple-satisfaction approach to game management. *Wildlife Society Bulletin, 1974*, 104–113.
- Hendee, J. C., Gale, R. P., & Catton, W. R. (1971). A typology of outdoor recreation activity preferences. *Journal of Environmental Education, 3*(1), 28–34. <https://doi.org/10.1080/00958964.1971.10801604>
- Hinds, J. (2011). Woodland adventure for marginalized adolescents: Environmental attitudes, identity, and competence. *Applied Environmental Education and Communication, 10*, 228–237. <https://doi.org/10.1080/1533015X.2011.669689>
- Houge, S., Hodge, K., & Boyes, M. (2010). The phasic nature of flow in high risk recreation. *Journal of Outdoor Recreation, Education, and Leadership, 2*, 159–162. <https://doi.org/10.7768/1948-5123.1059>
- Houge Mackenzie, S., & Kerr, J. H. (2016). Positive motivational experience over a three-day outdoor adventure trek in Peru. *Journal of Adventure Education and Outdoor Learning, 17*, 4–17. <https://doi.org/10.1080/14729679.2016.1189837>
- Hutson, G., & Bailey, L. (2008). Awakening place awareness during a 30-day wilderness leadership program. *International Journal of Wilderness, 14*(3), 23–28.
- Kaplan, R. (1984). Wilderness perception and psychological benefits: An analysis of a continuing program. *Leisure Sciences, 6*, 271–290. <https://doi.org/10.1080/01490408409513036>
- Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. Cambridge, England: Cambridge University Press.
- Kellert, S. R. (1998). *A national study of outdoor wilderness experience*. New Haven, CT: Yale University.
- Kellert, S. (2005). *Building for life: Understanding and designing the human–nature connection*. Washington, DC: Island Press.
- Knight, J. (2003). Negative results: Null and void. *Nature, 422*, 554–555.
- Knopf, R. (1983). Recreation needs and behavior in natural settings. In I. Altman & J. Wohlwill (Eds.), *Behavior and the natural environment* (pp. 205–232). New York, NY: Plenum Press. https://doi.org/10.1007/978-1-4613-3539-9_7
- Koecni, V. (2005). The aesthetic trinity: Awe, being moved, thrills. *Bulletin of Psychology and the Arts, 5*, 27–44.
- Korpela, K., Borodulin, K., Neuvonen, M., Paronen, O., & Tyrväinen, L. (2014). Analyzing the mediators between nature-based outdoor recreation and emotional well-being. *Journal of Environmental Psychology, 37*, 1–7. <https://doi.org/10.1016/j.jenvp.2013.11.003>
- Kreske, D. L. (1996). *Environmental impact statements: A practical guide for agencies, citizens, and consultants*. New York, NY: John Wiley and Sons.
- Larson, L. R., Whiting, J. W., & Green, G. T. (2011). Exploring the influence of outdoor recreation participation on pro-environmental behaviour in a demographically diverse population. *Local Environment, 16*(1), 67–86. <https://doi.org/10.1080/13549839.2010.548373>
- Larson, R. W. (2000). Toward a psychology of positive youth development. *American Psychologist, 55*, 170–183. <https://doi.org/10.1037/0003-066X.55.1.170>
- Larson, S., Farr, M., Stoeckl, N., Chacon, A., & Esparon, M. (2014). Does participation in outdoor activities determine residents' appreciation of nature: A case study from the Great Barrier Reef, Australia. *Environment and Natural Resources Research, 4*, 211–226. <https://doi.org/10.5539/enrr.v4n3p212>
- Louv, R. (2005). *Last child in the woods: Saving our kids from nature deficit disorder*. Chapel Hill, NC: Algonquin Books.

- Manfredo, M. J., Driver, B. L., & Tarrant, M. A. (1996). Measuring leisure motivation: A meta-analysis of the Recreation Experience Preference scales. *Journal of Leisure Research*, 28, 188–213. <https://doi.org/10.1080/00222216.1996.11949770>
- Marchand, G. (2014). Environmental attitudes of students enrolled in adventure programming classes. *Journal of Outdoor Recreation, Education, and Leadership*, 6, 180–182. <https://doi.org/10.7768/1948-5123.1263>
- Marsh, P. E., & Bobilya, A. J. (2013). Examining backcountry adventure as a spiritual experience. *Journal of Outdoor Recreation, Education, and Leadership*, 5, 74–95. <https://doi.org/10.7768/1948-5123.1188>
- Maslow, A. H. (1964). *Religions, values, and peak-experiences* (Vol. 35). Columbus: Ohio State University Press.
- McAvoy, L. E. O., Holman, T., Goldenberg, M., & Klenosky, D. (2006). Wilderness and persons with disabilities. *International Journal of Wilderness*, 12(2), 23–31.
- McKenzie, M. (2003). Beyond “the Outward Bound process”: Rethinking student learning. *Journal of Experiential Education*, 26(1), 8–23. <https://doi.org/10.1177/105382590302600104>
- Mirkin, B. J. (2014). Group social climate and individual peer interaction: Exploring complex relationships on extended wilderness courses. *Research in Outdoor Education*, 12(1), 58–79. <https://doi.org/10.1353/roe.2014.0004>
- Moore, R. L., & Driver, B. L. (2005). *Introduction to outdoor recreation: Providing and managing natural resource-based opportunities*. State College, PA: Venture.
- National Advisory Council on Regional Recreation Planning. (1959). *A user-resource recreation planning method*. Loomis, CA: The Council.
- Outdoor Foundation. (2017). *Outdoor recreation participation topline report 2017*. Retrieved from https://outdoorindustry.org/wp-content/uploads/2017/04/2017-Topline-Report_FINAL.pdf
- Outdoor Foundation. (2017). *Outdoor participation report: 2017*. Retrieved from <https://outdoorindustry.org>
- Outdoor Recreation Resources Review Commission. (1962). *Summary report*. Washington, DC: Author.
- Paisley, K., Furman, N., Sibthorp, J., & Gookin, J. (2008). Student learning in outdoor education: A case study from the National Outdoor Leadership School. *Journal of Experiential Education*, 30, 201–222. <https://doi.org/10.1177/105382590703000302>
- Pohl, S. L., Borrie, W. T., & Patterson, M. E. (2000). Women, wilderness, and everyday life: A documentation of the connection between wilderness recreation and women’s everyday lives. *Journal of Leisure Research*, 32, 415–434. <https://doi.org/10.1080/00222216.2000.11949925>
- Powell, R. B., Brownlee, M. T. J., Kellert, S. R., & Ham, S. H. (2012). From awe to satisfaction: Immediate affective responses to the Antarctic tourism experience. *Polar Record*, 48, 145–156. <https://doi.org/10.1017/S0032247410000720>
- Powell, R. B., Kellert, S. R., & Ham, S. H. (2009). Interactional theory and the sustainable nature-based tourism experience. *Society and Natural Resources*, 22, 761–776. <https://doi.org/10.1080/08941920802017560>
- Powell, R. B., Ramshaw, G. P., Ogletree, S. S., & Krafte, K. (2016). Can heritage resources highlight changes to the natural environment caused by climate change? Evidence from the Antarctic tourism experience. *Journal of Heritage Tourism*, 11(1), 71–87. <https://doi.org/10.1080/1743873X.2015.1082571>
- Preskill, H. S., & Torres, R. T. (1999). *Evaluative inquiry for learning in organizations*. Thousand Oaks, CA: Sage.

- Reynolds, P. C., & Braithwaite, D. (2001). Towards a conceptual framework for wildlife tourism. *Tourism Management, 22*(1), 31–42. [https://doi.org/10.1016/S0261-5177\(00\)00018-2](https://doi.org/10.1016/S0261-5177(00)00018-2)
- Salkind, N. J. (2009). *Exploring research* (7th ed.). London, England: Pearson.
- Schmalz, D. L., Kerstetter, D. L., & Kleiber, D. A. (2011). An evaluation of developmental outcomes at a free-choice oriented girls summer camp. *Journal of Outdoor Recreation, Education, and Leadership, 3*(1), 53–69. <https://doi.org/10.7768/1948-5123.1069>
- Sellers, R. W. (1997). *Preserving nature in the national parks*. New Haven, CT: Yale University Press.
- Skibins, J. C., & Powell, R. B. (2013). Conservation caring: Measuring the influence of zoo visitors' connection to wildlife on pro-conservation behaviors. *Zoo Biology, 32*, 528–540. <https://doi.org/10.1002/zoo.21086>
- Skibins, J. C., Powell, R. B., & Hallo, J. C. (2013). Charisma and conservation: Charismatic megafauna's influence on safari and zoo tourists' pro-conservation behaviors. *Biodiversity and Conservation, 22*, 959–982. <https://doi.org/10.1007/s10531-013-0462-z>
- Skibins, J. C., Powell, R. B., & Stern, M. J. (2012). Exploring empirical support for interpretation's best practices. *Journal of Interpretation Research, 17*(1), 25–44.
- Spirn, A. W. (1996). Constructing nature: The legacy of Frederick Law Olmsted. In W. Cronon (Ed.), *Uncommon ground: Rethinking the human place in nature* (pp. 91–113). New York, NY: W.W. Norton.
- Stern, M. J., Powell, R. B., & Hill, D. (2014). Environmental education research in the new millennium: What do we measure and what have we learned? *Environmental Education Research, 20*, 581–611. <https://doi.org/10.1080/13504622.2013.838749>
- Taniguchi, S. T., Freeman, P. A., & Richards, A. L. (2005). Attributes of meaningful learning experiences in an outdoor education program. *Journal of Adventure Education and Outdoor Learning, 5*, 131–144. <https://doi.org/10.1080/14729670585200661>
- Thapa, B., & Graefe, A. (2003). Forest recreationists and environmentalism. *Journal of Park and Recreation Administration, 21*(1), 75–103.
- Thomsen, J. M., Powell, R. B., & Monz, C. A. (2018). A systematic review of the physical and mental health benefits of wildland recreation. *Journal of Park and Recreation Administration, 36*(1), 123–148. <https://doi.org/10.18666/JPra-2018-V36-I1-8095>
- Tsaur, S. H., Yen, C. H., & Hsiao, S. L. (2013). Transcendent experience, flow, and happiness for mountain climbers. *International Journal of Tourism Research, 15*, 360–374. <https://doi.org/10.1002/jtr.1881>
- Vagias, W., & Powell, R. B. (2010). Backcountry visitors' Leave No Trace attitudes. *International Journal of Wilderness, 16*(3), 21–27.
- Vagias, W., Powell, R. B., Moore, D. D., & Wright, B. A. (2014). Predicting behavioral intentions to comply with recommended Leave No Trace practices. *Leisure Sciences, 38*, 439–445. <https://doi.org/10.1080/01490400.2014.912168>
- Warren, K. (2016). Gender in outdoor studies. In B. Humberstone, H. Prince, & K. A. Henderson (Eds.), *Routledge international handbook of outdoor studies* (pp. 360–368). Abingdon, United Kingdom: Routledge.
- Whittington, A. (2011). Life after the river: Long-term impacts of girls' participation in an adventure program. *Journal of Outdoor Recreation, Education, and Leadership, 3*, 40–52. <https://doi.org/10.7768/1948-5123.1076>
- Whittington, A., & Budbill, N. (2013). Breaking the mold: Impacts of adventure education on girls. *Journal of Outdoor Recreation, Education, and Leadership, 5*, 37–53. <https://doi.org/10.7768/1948-5123.1128>
- Widmer, M. A., Duerden, M. D., & Taniguchi, S. T. (2014). Increasing and generalizing self-efficacy: The effects of adventure recreation on the academic efficacy of early adolescents. *Journal of Leisure Research, 46*, 165–183. <https://doi.org/10.1080/00222216.2014.11950318>

- Wildland Research Center-University of California. (1962). *Wilderness and recreation—A report on resources, values, and problems*. Washington, DC: U.S. Outdoor Recreation Resources Review Commission.
- Willemyns, M., Gallois, C., & Callans, V. J. (2003). Trust me, I'm your boss: Trust and power in supervisor-supervisee communication. *International Journal of Human Resource Management, 14*, 117–127. <https://doi.org/10.1080/09585190210158547>
- Williams, K., & Harvey, D. (2001). Transcendent experience in forest environments. *Journal of Environmental Psychology, 21*, 249–260. <https://doi.org/10.1006/jevp.2001.0204>