

Wildland Fire and the Wilderness Visitor Experience

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Abstract: The purpose of this study was to understand wilderness visitors' perceptions of wildland fire and describe visitors' wilderness recreational experience following wildland fire in the Boundary Waters Canoe Area Wilderness (BWCAW). Qualitative interviews revealed visitors' perceptions of burned areas as well as if and how activities and behaviors were influenced by wildland fire occurrence. Results indicated that BWCAW visitors predominately perceived burned areas as interesting landscape features worthy of exploration. Route choices did not change due to burned areas but site selection and camping behaviors did. Wilderness planning and management implications include adjusting for spatial displacement and developing education material.

Introduction

Wildland fire has significant effects on many levels and subsequently has been the subject of a variety of research endeavors.



Sierra L. Schroeder in the BWCAW.
Photo by Stefanie Bergh.

Visitor research generally indicates that the impacts of wildland fire on recreation visitation fade over time (Englin et al. 1996) and that, although areas experiencing fire may see use fluctuations, long-term visitation impact is unlikely (Englin et al. 2001; Brown et al. 2008). Beyond visitation information, however, information on fire's effects on wilderness recreation experience is lacking, and, therefore,

a rich examination is warranted. This study described recreational visitors' perceptions of fire in a wilderness context recently affected by wildland fire. Specifically, among other objectives, this project sought to understand if and how fire influenced visitors' experiences, activities, and behaviors in the Boundary Waters Canoe Area Wilderness (BWCAW) of northern Minnesota.

Situated in the northern one-third of the Superior National Forest, the BWCAW is a unique area that contains more than 1,500 miles (2,414 km) of canoe routes (see

figure 1), nearly 2,200 designated campsites, and more than 1,000 lakes and streams (USDA Forest Service 2009). During the summers of 2006 and 2007, more than 100,000 contiguous forested acres (40,500 ha) burned, including areas that had not been burned in hundreds of years.

Previous research has documented post-fire recreational visitation (Beattie 1992; Borrie, McCool, and Whitmore 2006; Brown et al. 2008; Englin et al. 2006), revealed visitor support for fire as a management tool (Knotek et al. 2006), and explored the role of trust between land managers and the public (Liljeblad et al. 2009; Winter et al. 2005). Visitation-related studies indicate that wildland fire is



Figure 1—Paddling in the BWCAW. Photo by Sierra L. Schroeder.

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unlikely to cause a significant long-term decrease; visitation may decrease for the first year, but it is unlikely to be lower in the following years (Beattie 1992; Brown et al. 2008; Englin et al. 2001; Starbuck et al. 2006).

Only since 2006 has research assessed how wildland fire impacts visitors' attitudes and behavior (Borrie et al. 2006; Knotek et al. 2008). In a mail survey of wilderness visitors, Knotek et al. (2008) found a variety of visitor attitudes toward management-ignited fire in a wilderness area, with slightly more support than opposition. Borrie et al. (2006) conducted a visitor trend analysis using data from two years in the Bob Marshall Wilderness area, one year when wildland fire occurred and a year without fire. The data revealed that: (1) visitor characteristics were not significantly different between the two years; and (2) that visitor attitudes toward only 5 of 46 potential management actions differed. However, some visitor activities and length of stay changed: during the year with a large-scale fire, the number of hikers increased, fishing and horseback riding decreased, and overall stays were shorter (Borrie et al. 2006).

Beyond visitation, wilderness recreation experience and travel pattern are of interest. Perhaps not surprisingly, empirical studies regarding the aesthetics of forests reveal that evidence of fire detracts from beauty (Ribe 1989). However, a paucity of data documents the indirect and continuing impacts of wildland fires on visitor experiences (Morton et al. 2003). To fill this void, this study examined the effects of wildland fire on wilderness recreation experiences and visitors' behavioral changes.

Methods

In-depth face-to-face interviews allowed individual visitors to talk



Figure 2—Chet Kukuk portaging between Muskeg Lake and Long Island Lake not long after the 2007 Ham Lake fire in the BWCAW. Photo by Jeff Kukuk.

openly about their unique stories and to share rich insights regarding their BWCAW experience with wildland fire and burned areas. The depth and breadth inherent in a qualitative approach captured and conveyed the stories of BWCAW visitors in their own voices (see figure 2).

A purposive sample identified BWCAW visitors. Purposive sampling reflects the diversity of a group and seeks to include any “outliers” that perhaps would be discounted in a statistical study (Barbour 2001). The purposive sample for this study was obtained using a chain referral technique. Fliers were posted at outdoor sporting goods stores in the area, and a template email was circulated to known BWCAW visitors requesting referrals. As a result, 98 potential participants completed an online questionnaire that assessed BWCAW visits and relationship with the area. The sample was selected from this group to include visitors with various relationship strengths.

As the majority of BWCAW visi-

tors are from the Minnesota twin cities of Minneapolis and St. Paul, interviews were conducted in and around this area in convenient settings for the participants, such as a coffee shop, library, or office. This relatively informal setting provided a relaxed tone, and the interviews were conducted as “directed conversations” (Charmaz 1991). A semistructured interview guide was developed with various open-ended questions and probes to keep the conversation centered around the research themes while simultaneously employing probes to elicit further observations, perceptions, and responses (Kvale and Brinkmann 2008). All interviews were digitally recorded and transcribed verbatim.

Interview analysis consisted of meticulous reading and rereading of each transcript, organizing the data into categories, identifying themes and coding, and interpretation. The data were entered in and coding was facilitated by the qualitative analysis software NVivo (QSR International

Pty Ltd 2002). Dual readers provided interpretation discussion opportunities and validation of the interpretations. Also, participants commented via email on the accuracy of the interpreted individual's story and experience. This "member checking" is the process through which participants review and comment on the interpretations and the findings presented by the researcher (Creswell and Miller 2000), and according to Lincoln and Guba (1985, p. 314), is "the most crucial technique for establishing credibility." Note: references to respondents are all pseudonyms.

Results

Twenty-five BWCAW visitors, 12 females and 13 males, shared their stories in individual interviews between November 2008 and May 2009. Of these participants, 19 people had been to fire-impacted areas in the BWCAW and are included in this analysis. During the interview, each person was asked what, if anything, had changed in the BWCAW since their first visit. Fire and the resultant impacts on the landscape were the most frequent response; thus, perceptions of burned areas and subsequent impacts on activities and behaviors were explored in more depth. Results discuss data across individuals and focus on themes that describe BWCAW visitor perceptions of burned areas and the impacts of fire on recreation activities and behavior.

Visitor Perceptions of Burned BWCAW Areas

Several recurrent themes emerged across cases to provide a description of how visitors perceived fire-affected wilderness areas. Burned BWCAW areas were predominantly perceived as interesting landscape features, areas that sometimes incentivize a visit, and areas that offer a unique perspective.

Burned areas were interesting—Interviewees consistently perceived burned areas as interesting landscape features. Liz explained her perception of a burned area: "It's interesting to see what a forest fire can do, you know, a brand new fresh forest fire and say you're there a week later, there's already green coming up and it's really an interesting thing." Others mentioned exploring a post-fire forest to witness the new trees grow in; Andrea described it as fascinating and cool to see the fireweed and the aspens start to grow after a burn.

it!" he said. Isaac added: "I am excited to go get back into that area, maybe not every year, maybe every two or three years, just to see the ecological succession as it grows."

Wildland fire and burned areas offered perspective—As both a destructive and creative force, fire symbolized the duality of nature to BWCAW visitors and provided a unique perspective. For Isaac, the impact of fire was a "double-edged sword ... to see what it destroys is really sad ... and on one hand it's really good, almost happy, especially

Interviewees consistently perceived burned areas as interesting landscape features.

The dramatic revealing of topographic features following fire was the most memorable to some respondents. Ted remarked that it was interesting to go to a fire-affected area because "the topography is so different. You know the rock has been so burnt out, the algae has been burnt off, it's just this white-ish kind of look to it." Exploring this exposed surface can be enjoyable, and Brandt commented that "it's fun to be able to walk through ... and see the bedrock poking through and the regrowth, the species that come out, it's part of the experience."

Wildland fire prompted exploration—A recent fire was sometimes an incentive to explore an area. Paul explained that after an area was burned he would "want to plan a route where I wasn't going to miss some of that." For Bill, "the fact that the fire was there, was just an added little incentive" to explore the eastern side of the BWCAW. Isaac saw a magazine photograph of early successional plants and flowers growing in the BWCAW after a fire disturbance. "I gotta get in there, I gotta see

when you get out and see all the new life that comes about from it." Gerald also shared a story reflecting on the dual nature of fire:

We were portaging and we came out in an open area and it was just "Strawberry Fields Forever" but it was raspberries! It was just unbelievable to witness that kind of rebound you know, but it's just, it is really heart-wrenching to see some of the beautiful pine trees that have been there for hundreds of years maybe being scarred, but as you know, fire brings out the worst and the best of everything.

Respondents shared the idea that fire and burned areas provided a unique perspective to witness the transformation where the old and familiar was destroyed to make way for the new growth. Wildland fire was a reminder that the BWCAW is dynamic; Brandt described this: "Just realizing that it's a living breathing system makes me happy!" Justin enjoyed the unique opportunity to observe nature as it manifests itself in the wilderness, free

from human intervention; he explained, "Nature's not always going to be pretty, but it's always going to be awesome." The post-fire forest transformation was personally inspiring to Gerald. He noted that on his desk he keeps "a bouquet of jack pine branches with some open cones and some closed cones, and it just reminds me in those times in my life when I have been tested or been under fire, that growth can come out of times of testing."

Influence of Fire on Visitor Activities and Behavior

Overall, trip planning and entry point were not affected by fire; however, visitor campsite selection and behavior were impacted. Respondents explained that although they were interested in seeing and experiencing a post-fire area, they were not likely to choose a campsite that had been recently burned. Visitors had a limited length of time they wanted to spend in burned areas. As Mark explained, "I wouldn't want to camp in a burned out area, so you'd pass it and go on to another lake." Although he had gone specifically to explore an area that had been burned, Ted indicated, "Now that I've seen it, I'm not gonna camp there." Experiencing a unique post-fire landscape would be interesting to Bill, but after half a day exploring that setting he said he would want to "go someplace else because once you see a burned area, that's enough." Liz stated firmly that wildland fire "is a good thing," but when she went on to talk about selecting a campsite she said, "It's okay for a while ... I wouldn't go in and stay in an area like that ... it's not very pretty."

Campfire activities were influenced by fire. Several respondents became more cautious with campfires and expressed an increased concern and sense of responsibility regarding fire

safety. After seeing a burned area in the BWCAW, James was reminded that "you have to be very mindful and respectful of the campfires that we do have." He explained that now he always double-checks that the fire is put out before leaving the site or going to bed. Charlotte shared a similar story, mentioning that after seeing some of the BWCAW fires and also seeing how the

Overall trip planning and entry point were not affected by fire.

wind can pick up embers and sparks, all this "makes me a little more cautious with my own fires, and I try pretty hard to make sure that they're out!" Rick, who has visited the BWCAW since 1971, said that he recently started using a gas stove to prepare food, and he explained that seeing burned areas in the BWCAW "might be a reason why we may have gotten into more using gasoline stoves for cooking than wood, less chances of sparks flying off to start fires perhaps."

Discussion and Conclusions

In-depth interviews with BWCAW visitors indicated that perceptions of and behaviors in fire-impacted areas were influenced by fire. In summary, interviews revealed that fire-impacted areas of the BWCAW were frequently perceived as interesting, and this sense of novelty sometimes incentivized a visit. Although route choice and trip planning were not impacted, interviewees indicated that campsite selection and campfire use were influenced by the occurrence of wildland fire.

When considering this study within the context of the limited research on wildland fire and wilder-

ness visitors' perception and behaviors, some similarities as well as some differences were found. The stories shared by interviewees in this study are similar to the quantitative results reported by Dvorak, Borrie, and Watson (2008) and support the finding that route choice and trip planning are not generally affected by wildland fire. Dvorak et al. found that both day and overnight users rated the occurrence of lightning-ignited fire and of prescribed burning as an unimportant factor in choosing an area to visit. In addition, nearly all survey respondents indicated that trip plans were not affected by lightning-ignited fires or prescribed burns (Dvorak et al. 2008).

Quantitative findings reported by McFarlane, Boxall, and Watson (1998) differed notably from the stories and perspectives shared by participants in this study. Wilderness visitors to Nopiming Provincial Park, Manitoba, Canada, rated the "presence of burned areas along the route" as unenjoyable in a mail questionnaire (McFarlane et al. 1998). In contrast, interviewees in this BWCAW study described burned areas as interesting features in the landscape, offering a unique perspective.

In terms of visitor behavior change, this BWCAW study did not find changes in activity as did Borrie et al. (2006), but rather found that wildland fire influenced visitor travel patterns and campfire logistics. Although respondents generally confirmed that their broad trip plans would not change as the result of a fire, participants expressed that they would not select a campsite that had been affected by fire. Therefore, there is an increased possibility for crowding post-fire at campsites not affected by fire as well as the possibility of intra- or intersite displacement. This change in spatial use distribution may influence the social experience in the wilderness,

as crowding may occur at unaffected sites and opportunities for solitude may be diminished. In addition, biophysical impacts may result from increased use on more heavily used campsites. In their study of 19 heavily visited wilderness areas, Hall and Cole (2007) found that temporal or spatial displacement was a common response to undesirable conditions and certainly burned campsites were identified in this category by participants. As such, direct management and planning implications include understanding and adjusting for spatial displacement and subsequent changes in user density due to campsite selection.

Management strategies for social and biophysical impacts range from direct regulations to more indirect approaches such as visitor education (Manning 1999). Indirect educational approaches, particularly in wilderness areas, are often preferable to direct regulations as legislation and management agency policies mandate that wilderness visitors' opportunities for recreation be "unconfined" (Manning 1999, p. 214). Study results suggest that a variety of educational opportunities exist, including additional education regarding the short- and long-term impacts of fire on ecological systems and the novel experiences provided by such changes. Participants mentioned the appeal of witnessing ecological succession post fire. Although there is evidence that some visitors have an understanding of ecology and fire's role, others would benefit from additional information on this topic. This is an opportunity to teach wilderness visitors about the longer term impacts of fire and to provide educational materials about the ongoing process of post-fire ecological succession (see figures 3 and 4).

Education and information programs were critical after the 1988 fires



Figure 3—Aerial view of 2006 Cavity Lake fire showing the mosaic burn pattern. Photo by Mike Ferris, USDA Forest Service.

in Yellowstone National Park (YNP). Several agencies, including the USDA Forest Service and the USDO National Park Service, worked together to educate the public about the ecological role of fire and to restore the worldwide image of YNP (Beattie 1998). Notably, the BWCAW also engaged in educational opportunities and has created informative brochures. A brochure titled *What to Know Before You Go* is available online on the Superior National Forest BWCAW website. The brochure describes the BWCAW as a fire-adapted ecosystem, provides a recent history of fire occurrences, and outlines fire management strategies for the area (USDA Forest Service 2009). Educational tools, such as this brochure, help interested and uneducated visitors broaden their knowledge in the long term and provide depth of understanding about the role of wildland fire from multiple perspectives that include ecological, historical, and managerial.

BWCAW study results indicate that wildland fire does not necessarily have a negative impact on visitor wilderness recreation experience.

Specifically, participants in this study shared generally positive perceptions of wildland fire, including the idea that burned areas were interesting landscape features. Therefore, this holds promise for attracting visitors to an area and providing unique landscape experiences for them. Future research can determine if these perceptions hold true in other fire-affected wilderness areas.

This initial inquiry into BWCAW visitor experiences in fire-impacted wildernesses is useful, but future research opportunities include long-term follow-up on experiences, monitoring of visitor use patterns, and subsequent impacts. Additional research can explore if and how visitors' perceptions might vary depending on geography, experience use history, or other variables of interest. Although study participants expressed an interest in wildland fire and exploring burned areas, there were parameters around the extent of time this interest lasted. Future research can begin to identify the factors that influence the parameters around extent of interest in wildland fire and burned wilderness areas.

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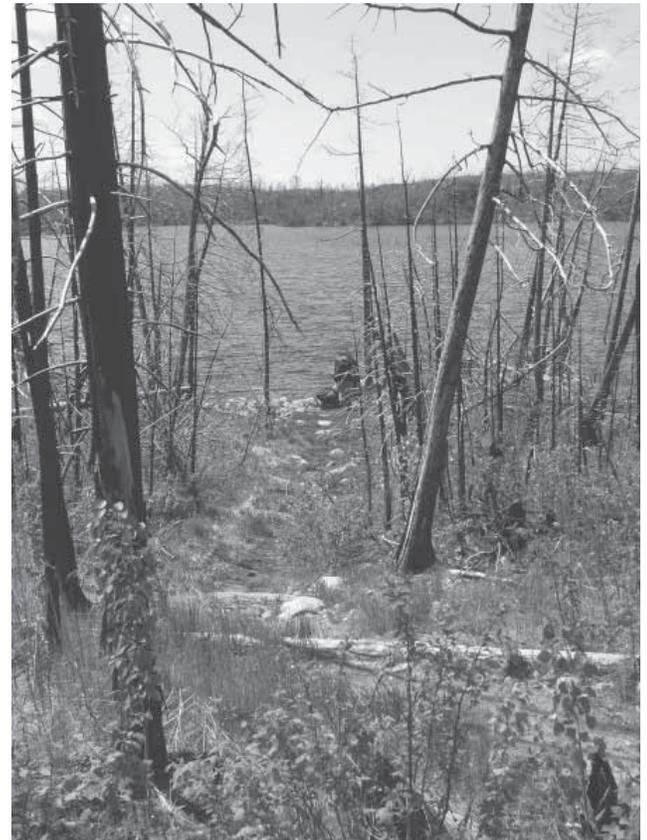


Figure 4—Vegetative regeneration on the portage trail to Alpine Lake in 2009 in the BWCAW. Photo by Jeff Kukuk.