

## Trust, acceptance, and citizen–agency interactions after large fires: influences on planning processes

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**Abstract.** Wildfires have increased in number and size in recent years, making post-fire forest management an increasingly important topic. Citizen–agency interactions, citizen trust, and citizen acceptance of management strategies are central to successful planning and decision-making in these settings. In this study, citizen opinions from the attentive public are evaluated in two locations near recent fires in Oregon: the 2003 Bear and Booth Complex Fires and the 2002 Biscuit Fire. Results suggest an agency's commitment to long-term interactions with citizens influences citizen trust in the agencies and acceptance of post-fire management strategies. There is broad acceptance for several post-fire management strategies (i.e. erosion control, replanting, reseeded). However, acceptance is highly dependent on trustworthy relations. Further, results suggest it is not enough to simply offer opportunities for public engagement; citizens need to feel that these activities were meaningful opportunities to participate. Although results differed between locations, overall the majority of respondents did not agree with how the local Forest Service and Bureau of Land Management handled forest planning after recent fires. Findings from this research indicate that positive citizen–agency relations need to be long-term and developed well before a fire occurs if post-fire actions are to be supported by communities.

**Additional keywords:** Bear & Booth (B&B) Fires, Biscuit Fire, decision-making, post-fire decision-making, restoration, salvage.

### Introduction

The magnitude and severity of wildfires in the western United States has greatly increased in recent years (National Interagency Fire Center 2007), particularly in the wildland–urban interface (WUI) where steady population growth has resulted in greater risk to people and property. With these trends expected to continue in the future, the process of recovering from large fires (greater than 40 000 ha, 100 000 acres) will become increasingly important to forest agencies and communities. However, many forest management personnel are challenged with the agency–public interactions that follow such events (Olsen and Shindler 2007). Numerous factors exist that make post-fire planning especially problematic.

The decision-making environment after most large fires is filled with a high degree of uncertainty, coupled with pressure for prompt action. Agency personnel on post-fire planning teams may have little personal experience to draw on in these circumstances, as wildfires at this scale are often a one-time event in the career of a line officer or technical specialist. Additionally, while much is understood about silvicultural systems and harvest operations, there is greater uncertainty about ecological restoration of lands affected by major wildfire (e.g. Sessions *et al.* 2004; Donato *et al.* 2006; Thompson *et al.* 2007). Nevertheless, agency personnel are called on to make technical judgments regarding forest management and restoration, communicate current and reliable information to community members, and include citizens in post-fire planning (Taylor *et al.* 2005; McCool *et al.* 2006). Not surprisingly, such circumstances

can result in considerable conflict over potential actions and the resulting management decisions that play out in the public arena. To be successful, planning efforts will require an informed and supportive constituency (Shindler *et al.* 2002). Trustworthy relations, developed well before the fire occurs, are significant to bringing agency personnel and citizens together to agree on a course of action after a fire (Carroll *et al.* 2000; Liljebland and Borrie 2006; Olsen and Shindler 2007).

A growing body of research addresses citizen–agency relations in natural resource settings, particularly interactions with citizens regarding fuel reduction activities and defensible space programs. However, research is limited in post-fire contexts. The purpose of this study is to improve understanding about citizen–agency relations concerning forest planning and decision-making after large wildfires on federal lands, and to examine differences between sites that suggest 'one-size-fits-all' policies may not be appropriate. More specifically, the intent was to (1) assess public opinion of citizen–agency interactions; (2) examine citizen trust in the US Forest Service and Bureau of Land Management (BLM) to plan and implement practices; and (3) measure acceptance of post-fire management strategies. This was accomplished by examining the experiences of the attentive public in post-fire planning using survey data in two locations: south-west and central Oregon where large wildfires recently occurred. The attentive public are often the first to respond to new management initiatives as they are engaged in the issues and are most likely to support or block agency plans (Shindler and Toman 2003). Thus, their opinions can be useful

in understanding the success or failure of agency decision processes. In this study, attentive public is defined as citizens who have demonstrated past interest in local forest issues, through participation in Forest Service-led field trips, attendance at public planning meetings, and submission of input during public comment periods or putting their name on a mailing list for information. Prior to the surveys, these two sites were also examined as part of a qualitative study including interviews of citizens and agency personnel.

### Management context

Forests in Oregon illustrate the challenges created by the increase in fire magnitude and frequency. Two study sites were selected where large wildfires had recently occurred: south-western Oregon in the vicinity of the Biscuit Fire (2002), and central Oregon in the vicinity of the Bear & Booth (B&B) Fires (2003). Lightning was the official cause of both fires. Both burned a variety of land-use types (predominantly Forest Service lands) and were eventually extinguished by fall (autumn) precipitation. Plans for recovery projects were developed at both sites that included a variety of management practices to be applied in different areas. These practices included seeding, measures to control erosion, replanting of conifers, harvest of burned trees (i.e. salvage), actions to protect human safety, and leaving some areas alone. A detailed description of the two sites is provided here so that implications can be drawn about social and environmental similarities and differences between the sites.

#### *2002 Biscuit Fire in south-west Oregon*

The Biscuit Fire encompassed over 200 000 ha (~500 000 acres) in the Siskiyou Mountains. Over one-third of the fire was in designated wilderness area, and much of the rest of the fire was in roadless or matrix areas on the Rogue River–Siskiyou National Forest and Medford BLM lands. Disparate communities are spread over a large area surrounding the fire, though many of the local communities have a strong history of timber activity as a primary source of local income. Included in the burn area were areas of old-growth forest, a passionate issue for many Oregonians, and several popular recreation sites. Few structures were burned, though thousands of residents were put on evacuation notice. It was one of the largest wildfires in USA history and the largest recorded fire in the state of Oregon, which added an additional level of national media attention and controversy as planning and decision-making proceeded (Durbin 2003; Conroy 2007; Milstein 2007). Prior to the Biscuit Fire, few other fires had burned in the area in recent years.

Plans for management of the affected Forest Service and BLM lands were developed from 2002 to 2004. Earlier interviews in the area suggested there was an expectation among both local and national-level agency personnel as well as some local citizens that timber extraction occur in the burned areas. At the same time, there were strong reactions from other local citizens and environmental groups that timber removal be minimised or excluded altogether. Final plans included salvage logging on over 7700 ha (19 000 acres), some of which was in Late Successional Reserves and Inventoried Roadless Areas (USDA Forest Service 2004).

Local Forest Service and BLM personnel have had mixed success interacting with community members on forest management issues in the past. Agency relations with community members were productive on several previous projects; however, these interactions cooled considerably over time (Shindler 2003). Many individuals attributed this shift partly to policy and budget constraints imposed by the Federal government on the ability of local personnel to work cooperatively with citizen groups (Stankey *et al.* 2003).

During the planning phase of the Biscuit Fire Recovery Project, a broad range of outreach activities were implemented. These included numerous agency-led public meetings in nearby communities, citizen-organised meetings (some with professional facilitators), a workshop-style conference hosted by the agencies, agency presentations with question-and-answer periods, and a limited number of agency-led and invitation-only field trips. Prior interviews suggested the communication focus for the agencies during this planning phase was to keep information flowing and to remain consistent with released messages. Overall, nearly 23 000 written comments were received by the Forest Service and BLM regarding plans for the burned area.

#### *2003 B&B Fires in central Oregon*

The B&B Fires encompassed nearly 37 250 ha (~92 000 acres) in the Cascade Mountains of central Oregon, an area where forest use is focussed on recreation and amenity benefits. Nearly half of the fire burned in a designated wilderness area on the Deschutes and Willamette National Forests. The remainder of the fire burned primarily on other Forest Service lands, though some other ownerships were also affected. Communities near the fire are small, with similar amenity interests and have a history of citizen–agency cooperation over the last dozen years. Old-growth forested areas were included in the burn area. Few structures were affected, though many residents were evacuated on two different occasions. It was the largest wildfire in recorded history for the Deschutes National Forest. Residents in this area are also familiar with recent smaller wildfires, some requiring evacuations and destroying a few homes in the immediate area. In addition to the B&B Fires, five other fires have burned more than 20 000 ha (50 000 acres) of ponderosa pine (*Pinus ponderosa*) and mixed-conifer forests in the region since 2002 (Toman *et al.* 2008a).

Plans for management of the affected lands on the Deschutes National Forest were developed from 2003 to 2005. As with the Biscuit Fire, earlier interviews suggested an expectation of timber extraction from the burned areas, while others advocated that timber removal be minimised. Final plans included salvage logging on over 2750 ha (6800 acres), some of which were in Late Successional Reserves (USDA Forest Service 2005).

During the planning phase of the B&B Fire Recovery Project, numerous outreach activities were implemented, including several agency-led public field trips conducted within weeks of containment, agency-led public meetings, and one-on-one discussion with and feedback from key local community groups on planning choices. Prior interviews identified that the communication focus during this planning phase was to use ‘plain English’ and humanise concerns and individuals wherever possible. Overall, more than 100 written comments were

received by the Forest Service regarding plans for the burned area.

### Related research

Research on the sociopolitical aspects of forest and fire management has steadily increased in recent years. Findings from a variety of contexts are relevant to this study. Citizen–agency interactions, trust, and social acceptability are introduced in this section, as each is an influencing factor in successful forest planning and decision-making (Winter *et al.* 2004; Toman *et al.* 2006; Liljebblad *et al.* 2009).

Citizen–agency interactions, especially agency communication efforts, are important during all phases of the fire cycle (pre-, during, and post-fire), and, decisions made in one phase often influence the options available in other phases (McCool *et al.* 2006). Hence, public expectations about agency communication and management decisions are often based on prior, pre-fire experiences (McCool *et al.* 2006; Olsen and Shindler 2007). The process of *how* citizens and community groups are engaged is an important factor in determining citizen–agency communication and interaction effectiveness (Toman *et al.* 2006). More focussed messages than those used in large-scale media campaigns are necessary. Considerable research in fire-prone communities indicates two-way, interactive communication activities are more effective at increasing understanding and support than one-way (i.e. brochures, news articles, newsletters) information delivery (Parkinson *et al.* 2003; McCaffrey 2004; Toman *et al.* 2006). Studies in post-fire communities emphasise the importance of engaging local social networks and including community leaders and organised groups for building goodwill and the successful implementation of post-fire projects (Burns *et al.* 2008; Toman *et al.* 2008a). Other fire-related studies support paying credence to location-specific social and environmental factors, including avoidance of ‘one-size-fits-all’ policies (Mendez *et al.* 2003; Brunson and Shindler 2004).

Barriers and obstacles to effective citizen–agency interactions also exist in the post-fire planning environment. Olsen and Shindler (2007) identified four that were generalised across many contexts. First, in many settings, there is a lack of common language about activities and goals. Use of words like ‘restoration’ when there is no clear definition or understanding among agency personnel and citizens about its meaning can be problematic (Hull and Robertson 2000; Mowrer 2004). Second, there remains a focus on forest aesthetics and returning to natural landscapes, when there is little agreement on what ‘natural’ means (Kay 1997; Shindler *et al.* 2002). Third, there can be intense pressure for rapid decision-making (i.e. over salvage logging) when ecological and social uncertainty may be considerable, and rushing to judgment could deter building of support for solutions (Stankey and Shindler 1997). Fourth, a lack of trust in the citizen–agency relationship can affect how citizens react to and support future agency plans (McCool *et al.* 2006).

Citizen trust in forest agencies may be the most essential component to successful implementation of any forest management program (Carroll *et al.* 2000; Winter *et al.* 2004; Burns *et al.* 2008). This can be especially crucial in post-fire environments where citizens tend to lack personal experience with conditions and practices, but are still involved emotionally after the event

(McCool *et al.* 2006; Olsen and Shindler 2007; Cvetkovich and Winter 2008). Community relations built on trust have many positive benefits including conflict reduction, ability to organise, decreased costs, and cooperative behaviour (Rousseau *et al.* 1998), all of which are important in reaching well-supported decisions after fires. Recent wildfire research suggests that trusting relations can be developed when agencies and citizens organise before fires occur, specifically to build fire-safe communities and work together on fuel reduction activities (Winter *et al.* 2004; Liljebblad *et al.* 2005; Knotek and Watson 2006). Specifically, communication about risks and benefits can be a factor in citizen trust levels and corresponding support for policies (Frewer *et al.* 2003). The resulting positive citizen–agency interactions can also carry through during and after a fire event when uncertainty is high (Ryan and Hamin 2006; Burns *et al.* 2008; Toman *et al.* 2008a).

An example of a successful trust-building interaction comes from public bus tours organised by the Sisters Ranger District after the 2003 B&B Complex Fires. Participants responded very positively to the tours, rating them as useful, fair, balanced, and contributing to the credibility and trustworthiness of managers (Toman *et al.* 2008a). Similar experiences have been reported on other management units as well (e.g. USDI National Park Service 2003). However, Toman *et al.* (2008a) point out that trust and credibility are too complex to be fostered or repaired exclusively with one activity. Rather, events like these tours, combined with numerous other interactions over an extended period of time, feed the long-term development of the citizen–agency relationship (Knopp and Caldbeck 1990; Wondolleck and Yaffee 2000; Smith and McDonough 2001). Indeed, research has shown trust is centred on the frequency, reliability, and predictability of contact over the history of a relationship, as well as fairness, objectivity, and similarity (Fukuyama 1995; Johnson 1999; Poortinga and Pidgeon 2003; Earle 2004; Winter *et al.* 2004).

The long-term sustainability and adoption of a forest management practice is influenced by more than just trust; practices must also be socially acceptable (Firey 1960; Shindler *et al.* 2002). Although many researchers and forest management personnel have come to understand the value of working towards public acceptance, it is not something the agency can fully control (Mascia *et al.* 2003; Thornhill 2003; Kneeshaw *et al.* 2004). At best, managers can work with citizens to strengthen factors that affect acceptance, including trust, knowledge of conditions and practices, and their understanding of management objectives and potential risks (Loomis *et al.* 2001; Winter *et al.* 2002).

Of particular relevance to post-fire settings, Stankey and Shindler (2006) noted that public acceptability judgments are *contextual*, *conditional*, and *provisional*. They are *contextual* because they are based on familiar, identifiable places that hold meaning for citizens. Community members often care deeply about potential plans for these areas. Judgments are *conditional* because they are often based on whether actions are fair to all stakeholders and decision processes are inclusive of those who may be impacted. This can be especially important after a fire when effects of the burn are often felt most intensely by specific groups (i.e. those with property damage, loss of businesses, evacuees, etc.). Judgments are also *provisional* because public opinions change; what people find acceptable today may

fall out of favour depending on new information or management actions. Numerous authors identify trust as a factor that shapes, sustains, and alters public acceptance of management practices, particularly after wildfires (Ryan and Hamin 2006; Olsen and Shindler 2007; Burns *et al.* 2008). Citizen–agency interactions are one platform where public understanding of post-fire issues and implications can be fostered, creating more responsible, stable, and consistent public opinion (Shindler *et al.* 2002).

The few post-fire studies conducted thus far found high levels of public acceptance for restoration activities such as erosion control and replanting. However, acceptance of salvage harvesting appears highly contextual (Ryan and Hamin 2006; Toman *et al.* 2008a), with higher rates of approval evident when citizens trust the managing agency to implement strategies (Carroll *et al.* 2000). Acceptance of salvage is also dependent on the specific location where work will be conducted (Ryan and Hamin 2006), as well as the openness and quality of deliberation in the planning process used to determine sales (Olsen and Shindler 2007).

## Methods

The results presented in this paper represent the second phase of research in these communities. The first phase included interviews with a total of 11 agency personnel and 15 community members from the two study sites. Themes identified during the interviews were used to develop the eight-page mail questionnaire examined in this paper. Survey questions addressed respondents' awareness and opinions of federal agency planning and decision-making with regards to general forest management, forest management after fires, and forest management after the Biscuit and B&B Fires specifically. Correlations identified specific factors that had a relationship with key variables in question. To better understand how local context may influence response to questions, comparisons ( $\chi^2$ ) between the two sites were also conducted.

This research employed an attentive public sample, which is characterised by a higher level of citizen participation in government than the general public (Barber 1984; Luch 1987). Use of this sample is appropriate for two reasons: (1) findings from this population are meaningful to agency personnel because the attentive public includes individuals who are likely to pay attention to or participate in agency programs; and (2) opinion surveys often target the attentive public because these individuals are usually the 'first responders' to a new management initiative and, in turn, agencies must account for their input (Shindler and Toman 2003). Samples were drawn from citizen lists maintained by the Forest Service in each region; lists were composed of individuals who had submitted comments to the local Forest Service or BLM on the Biscuit and B&B (or other recent) fires, participated in fire-related outreach activities, or requested information about recent forest management activities. Only residents within the two study regions were included in the sample. In short, the sample includes local citizens who had interacted with or submitted comments to their local Forest Service office after the fires occurred.

Survey administration began in January 2007 according to a modified 'tailored design method' (Dillman 2007). In the Biscuit Fire region, 261 out of 427 surveys were completed and

returned for a response rate of 61%. The B&B Fires survey was distributed to 358 individuals, with 250 surveys returned for a response rate of 70%. Given these high response rates and the associated reduction of non-response error (Lehman 1989; Vaske 2008), no non-response bias check was completed. This level of response is sufficiently high to make inferences to the larger study population of the attentive public in the two study locations (Lehman 1989). Additionally, because fire managers may interpret these results as they relate to similar settings, it is likely these findings will ultimately be useful beyond the current study.

## Findings

Participants had a mean age of 58 years and 65% were male. Nearly half of Biscuit respondents lived within 32 km (20 miles) of the fire boundary, whereas half of B&B respondents lived within 8 km (5 miles) of the fire boundary. Despite this difference between sites, there was no significant relationship between distance from fire boundary and any variables of interest. Respondents considered themselves moderately or well informed about forest conditions and management after fires. When asked about priority trade-offs between environmental and economic considerations when managing forests, the majority of respondents at both sites tended to prefer actions that protected the environment.

Findings are presented in four sections: (1) acceptance of post-fire management strategies; (2) citizen–agency post-fire interactions; (3) trust in the agencies; and (4) factors influencing acceptance.

### *Acceptance of post-fire management practices*

Forest agencies have several options for managing lands after a fire once emergency crews have finished stabilising hazardous conditions. These include erosion control measures, replanting trees, seeding with grass or forbs, harvesting burned trees, managing for safety only, and taking no action. These practices were accompanied by short definitions in the questionnaire. Respondents were asked to judge each practice separately. Table 1 displays each management option and respondents' selection from five response choices provided.

Because the second response choice represents the common form of agency implementation for management practices, selection of the first or second choice was interpreted as acceptance of the specific practice. Based on this approach, three practices (erosion control, replanting, and seeding) were acceptable to over 90% of survey respondents from both sites. B&B participants were willing to give managers more discretion for implementation of these three practices as well as for harvesting burned trees. Even this most potentially contentious practice – harvesting burned trees – was acceptable to nearly three-quarters of respondents at both sites (74% on the Biscuit and 83% on the B&B). Overall, relatively few participants indicated any of these six practices should not be used (third and fourth answer choices). On the whole, it appears that B&B respondents favoured more active management than their Biscuit counterparts. Finally, it is evident that almost everyone had an opinion on these practices as few *don't know* responses were given.

**Table 1. Percentage acceptance of post-fire management practices**  
 Chi-square analysis showed significant difference between sites at  $P \leq 0.05$  for all practices except for 'No action'

Public acceptance of post-fire practices	Erosion control		Replanting		Seeding		Harvesting burned trees		Manage for safety only		No action.	
	Biscuit	B&B	Biscuit	B&B	Biscuit	B&B	Biscuit	B&B	Biscuit	B&B	Let nature take its course Biscuit	B&B
This practice is a legitimate tool that land managers should be able to use whenever they see fit	70	78	70	85	63	78	46	56	43	33	37	29
This practice should be done only infrequently, in carefully selected areas	24	18	21	11	29	16	28	27	28	35	21	25
This practice should not be considered because it creates too many negative impacts	2	1	2	1	2	1	16	7	16	12	19	19
This is an unnecessary practice	3	1	4	1	5	1	10	9	11	13	21	23
Don't know	1	3	3	2	2	4	1	1	3	7	2	5

*Citizen–agency post-fire interactions*

Respondents' opinions of citizen–agency interactions in planning and decision processes after the fires are displayed in Table 2. Response choices for a set of statements were a four-point scale (*strongly disagree* to *strongly agree*) with a *don't know* option. For each statement, the percentage of *agree* or *strongly agree* responses are presented. Because *don't know* responses were relatively high in some cases, these are presented in parentheses.

Overall, respondents at both sites were substantially critical of agency actions. The low-level agreement for the first four statements, dealing primarily with agency decision processes, suggests citizens are not satisfied with their role in decision-making or in the information agencies use to make decisions. Participants also gave agency managers low marks for explaining options and consequences and voiced scepticism about the information they provided. Citizens' overall lack of trust and agreement with how post-fire management was handled is revealed by responses about the last two statements. Also striking is that numerous respondents indicated *don't know* for many statements, particularly B&B participants who appear to have had fewer interactions with agency personnel. Even so, it is noteworthy that in every case, the B&B participants had more positive opinions than those from the Biscuit site.

*Trust in the agencies*

Research has shown citizen trust in forest agencies is important to the success of forest management policies and practices. Respondents' rated their level of trust in the local Forest Service or BLM to make good decisions about forest management using a four-point scale (*no trust* to *full trust*) and a *don't know* category. Subsequently, they were asked if their trust in the forest agencies had changed based on how management activities were handled after the fire. Results are reported in Table 3.

Approximately two-thirds of the B&B participants voiced a moderate or full level of trust in the agencies whereas scores for Biscuit participants were significantly lower. Few respondents used the *don't know* option. Following this pattern, the majority of B&B respondents said their trust in management activities did not change after the fire. However, the majority of Biscuit respondents indicated a decrease in trust. Still, a substantial number (30%) at the B&B site also noted a decrease. Few respondents at either site indicated an increase in trust.

An open-ended follow-up question asked why their trust had changed, and the majority of respondents answered. Of the few who indicated an increase in trust, good public–agency interaction and communication skills were noted. Reasons for a decrease in trust across both sites included: (1) beliefs about political influence (by both national government and interest groups) on local agency personnel at the expense of ecological factors; (2) that management activities were illegally conducted (e.g. legally required public notification was not completed); and (3) that citizen input, local needs, and forest health (some arguing more harvest was needed, some less) were ignored.

*Factors influencing acceptance*

To better understand how factors such as trust and interactions with agency personnel may affect acceptance of post-fire

**Table 2. Citizen–agency interactions for post-fire planning and decision making**

Response categories range from 1 = strongly disagree to 4 = strongly agree, and don't know. Chi-square analysis showed significant difference between sites at  $P \leq 0.05$

Statement	Percentage agree or strongly agree (percentage don't know)	
	Biscuit Fire	B&B Fires
Citizens had meaningful opportunities to contribute to decisions	31 (8)	43 (20)
Federal managers have used public input to help make decisions	24 (9)	45 (16)
Thus far, management decisions after the fire have been made according to a fair process	11 (11)	33 (25)
Decisions were based on scientific information	17 (12)	38 (29)
Federal forest managers did a good job of explaining management options, activities, and consequences	32 (12)	46 (19)
I am sceptical of information from federal forest agencies	73 (5)	57 (3)
Federal forest managers have effectively built trust and cooperation with local citizens	13 (6)	40 (9)
I agree with how local agency staff have handled forest management after wildfires	11 (8)	31 (16)

**Table 3. Trust in the agencies**

Response categories range from 1 = no trust to 4 = full trust, or don't know. Chi-square analysis showed significant difference between sites at  $P \leq 0.05$

Trust	Percentage moderate or full trust (percentage don't know)	
	Biscuit Fire	B&B Fires
My level of trust in local Forest Service or Bureau of Land Management staff to make good decisions about forest management.	41 (1)	66 (4)
Based on how management activities were handled after the fire, my trust in the forest agencies has . . .	Percentage of respondents	
Increased	1	8
Not changed	43	62
Decreased	56	30

management strategies, correlation analysis was conducted. Because trust levels and responses about citizen–agency interactions were significantly different between sites, correlations were run separately for each site. Two column variables are presented: trust and interactions. Trust scores from Table 3 (*no trust to full trust*) were used in the analysis. The citizen–agency interaction variable represents an additive scale calculated from ratings in Table 2. Scores from the statement 'I am sceptical of information from federal forest agencies' were reverse-coded to match the attitude direction of the other statements. Factor and reliability analysis confirmed all variables in this scale represent a single latent variable (Cronbach's  $\alpha = 0.903$ ). Row variables correspond to acceptance of each post-fire management strategy from Table 1. *Don't know* responses were omitted in all cases. Results of the correlation analysis are reported in Table 4.

Both trust and citizen–agency interactions are positively correlated with nearly all active post-fire management practices (erosion control, replanting, seeding, and harvest of burned trees) at both sites. Only replanting and seeding (at the B&B site) seem unaffected by these measures. However, with the strongest correlations for all active management options, trust and

citizen–agency interactions appear to be major influences on public acceptance of harvesting. Interestingly, the no-action alternative was negatively correlated with both measures, suggesting respondents with low levels of trust or negative interaction experiences do not want managers to conduct any active management practices.

To further test the importance of citizen–agency interactions, participation rates and perceptions about specific interactions with agency personnel were examined. Respondents were first asked if they had participated in four activities that occurred at both sites: (1) providing written comments on forest plans; (2) speaking with agency personnel about forest plans; (3) attending a public meeting with agency personnel; and (4) participating in field trips or on-site demonstrations with agency personnel. At least one-quarter of respondents at both sites participated in each activity. For many activities, a majority indicated participation. Respondents were then asked to rate how worthwhile activities were in which they had participated. Response options included a four-point scale from *not worthwhile* to *extremely worthwhile*. The questionnaire also explained that *worthwhile* meant that an activity was a good, credible exchange of information and they would participate in it again. Findings

**Table 4. Correlation of influences on public acceptance of post-fire management practices**

Trust in local agency response categories range from 1 = no trust to 4 = full trust. Citizen–agency interactions are an additive index of responses to statements in Table 2 (Cronbach’s  $\alpha = 0.903$ )

Acceptance of post-fire management practices	Trust in local agency		Citizen–agency interactions	
	Biscuit Fire	B&B Fires	Biscuit Fire	B&B Fires
Erosion control	0.172 <sup>A</sup>	0.219 <sup>A</sup>	0.182 <sup>A</sup>	0.365 <sup>A</sup>
Replanting	0.261 <sup>A</sup>	0.143 <sup>A</sup>	0.378 <sup>A</sup>	0.178
Seeding	0.176 <sup>A</sup>	0.116	0.253 <sup>A</sup>	0.264 <sup>A</sup>
Harvesting burned trees	0.311 <sup>A</sup>	0.324 <sup>A</sup>	0.465 <sup>A</sup>	0.418 <sup>A</sup>
Manage for safety only	−0.076	−0.031	−0.282 <sup>A</sup>	0.003
No action. Let nature take its course	−0.259 <sup>A</sup>	−0.189 <sup>A</sup>	−0.378 <sup>A</sup>	−0.281 <sup>A</sup>

<sup>A</sup>Spearman correlation is significant at  $P \leq 0.05$ .

**Table 5. Participation rates and worthwhileness of interactions with agency personnel after fire**

Response categories range from 1 = not worthwhile to 4 = extremely worthwhile. Chi-square analysis showed significant differences between sites at  $P \leq 0.05$

Activity	Percentage moderately or extremely worthwhile (percentage participated)	
	Biscuit Fire	B&B Fires
Provided written comments on forest plans	17 (72)	34 (46)
Spoke with agency personnel about forest plans	25 (59)	56 (51)
Attended public meeting with agency personnel	26 (62)	51 (47)
Participated in field trips or on-site demonstrations with agency personnel	37 (28)	73 (32)

**Table 6. Influences on public acceptance of agency actions and decisions**

Response categories range from 1 = not important to 5 = extremely important

Statement	Percentage very or extremely important	
	Biscuit Fire	B&B Fires
Trust in the decision-maker	74	83
The decision is based on environmental consequences	74	82
When I know the objectives of a proposed management action	74	79
Scientists play a role in reviewing alternatives for management decisions	68	80
Actions will help reduce the spread of non-native species	65	76
The decision leads to active management (thinning) to maintain or restore conditions <sup>A</sup>	60	66
The decision protects wildlife habitat over human use <sup>A</sup>	56	65
The decision maintains forest access for recreation	52	51
Actions will help support the local economy <sup>A</sup>	53	34
The decision was based on economic consequences <sup>A</sup>	46	34

<sup>A</sup>Chi-square analysis showed significant differences between sites at  $P \leq 0.05$ .

are presented in Table 5. Responses in bold represent ratings (*moderately* or *extremely worthwhile*) of respondents who participated in each specific activity (indicated in parentheses).

Results are mixed. For the Biscuit Fire, providing written comments was the most common activity, whereas B&B respondents spoke with agency personnel more than any other form of interaction. Fewer respondents participated in a field trip, though earlier interviews suggested this activity may have been the least available to local citizens at each site.

Only those who participated in each activity were asked to rate it. Biscuit respondents generally gave low ratings about their

experiences. Responses from the B&B site were significantly better; the majority found all activities except providing written comments as *moderately* or *extremely worthwhile*. Field trips fared the best at both sites.

As one additional way to examine influences on public acceptance, respondents were asked how important 10 factors were to their judgments of agency actions and decisions. Response options included a five-point importance scale (*none*, *slightly*, *moderately*, *very*, and *extremely*). A *don't know* option was not provided. Findings are presented in Table 6, roughly rank-ordered from most important to the least important factor. For

each statement, the percentage of *very* and *extremely important* responses is presented.

Several influences were important at both sites, with approximately three-fourths or more of the participants giving high marks to trust in the decision-maker, basing the decision on environmental consequences, and knowing the objectives of a proposed management action. Overall, beliefs were somewhat stronger among B&B participants, who also gave high ratings (over 75%) to scientists playing a role in reviewing alternatives and actions helping to reduce non-native species. Approximately two-thirds of Biscuit respondents also felt these factors are important. Actions that support the local economy and basing decisions on economic consequences were among the least important influences on public acceptance.

## Discussion

Post-fire forest management on federal lands is ecologically and socially complex. This paper explores citizen–agency interactions, trust, and acceptance of post-fire management practices in two post-fire settings. It must be emphasised that this study did not employ random sampling, and therefore findings cannot be generalised to the general public. Rather, this study examines the attentive public – individuals who by definition are more active in government (Barber 1984; Lunch 1987) and tend to be those most likely to actively support or oppose agency plans. Several findings are noteworthy.

First, there is broad acceptance from respondents for all post-fire treatment options. Acceptance is nearly unanimous for the less controversial decisions such as use of erosion control, replanting, and seeding in selected areas. A strong majority of respondents in this study also accepted the use of salvage in carefully selected areas, despite these participants tending to prefer an environmental over economic focus on decision-making, and the fact that the commercial harvest of burned trees has been at the centre of post-fire controversy in numerous locations (Duncan 2002; Preusch 2004). Although the acceptance of these four active practices is high, further analysis demonstrated low trust levels may actually reduce this acceptance in both locations.

Although acceptance for treatment was high, a majority of respondents also supported the no-action alternative. As each alternative was measured independently in this survey, this apparent conflict of accepting both heavily intensive (i.e. salvage) and totally passive (i.e. no action) approaches is possible. Such widely supportive judgments of seemingly opposite approaches may result from the expectation that each practice would take place in *different* and carefully selected areas, and that each practice may have an acceptable use somewhere on the affected landscape. These findings are useful to managers in that participants made clear that understanding the purpose and spatial context of proposed actions ('knowing the objectives of a proposed management action') was one of the most important factors influencing their judgment of agency decisions. Also noteworthy is that 40% of respondents completely rejected the no-action alternative, suggesting many citizens see a need for some form of management on these lands.

Second, respondents' assessments of citizen–agency interactions were generally negative. Not only did participants give managers low marks for providing information and opportunities

for interaction, they also largely indicated that many interaction activities were not worthwhile. One possible explanation for these low marks surfaced in the open-ended questions in this survey; citizens were dissatisfied with how the agencies used public input, as well as a lack of understanding about the information used to make decisions. Failure to adequately listen and respond to citizens has been cited as a common problem elsewhere (Cortner *et al.* 1998; McCool *et al.* 2000; Kent *et al.* 2003; Mendez *et al.* 2003; Campbell 2004) and also leads to loss of trust as was noted by respondents in the present study. Closer examination of these responses reveals more clues; participants from the B&B site generally responded more positively than participants from the Biscuit site. One explanation that may have contributed to the different trust and interaction responses could be the differences in fire size, media attention, and associated fear. The Biscuit Fire was larger and received a considerable amount of media attention, which may have led to a less-trusting local citizenry, and when distrust is present, it is more difficult to get collaborative efforts to work well (Wondollock and Yaffee 2000). Another likely explanation is that the more developed relationships and history of positive citizen–agency interactions at the B&B site contributed to higher assessments after the fire. Other researchers have suggested this same relationship where pre-fire interactions influence post-fire relationships (Burns *et al.* 2008).

In previous studies (Burns *et al.* 2008; Toman *et al.* 2008b), the ability of agency personnel to engage citizens about forest treatment options both before and after a fire appears to be quite important. As the present research supported, this frequently means going beyond the traditional agency–public meeting to include more personal, smaller-group, and face-to-face opportunities. The traditional meetings do serve a purpose; yet they are often cited as one-way communication that is used simply to comply with the National Environmental Policy Act (NEPA) rather than serving the needs and interests of concerned citizens (Cortner *et al.* 1998; Shindler *et al.* 2002). Indeed, interview research in both study sites among citizens and agency personnel reveals the sentiment that the traditional NEPA approach is not sufficient for post-fire planning (Toman *et al.* 2008b). The need to explore new approaches for disseminating, explaining, and discussing information continues to be prominent in forest and social science literature. Field trips, which provide opportunities for face-to-face discussion and on-the-ground learning, were found most worthwhile in this research. Although this is just one of many possible activities that could occur in a post-fire environment, it is an obvious place where agencies can build on their strengths and local citizens' interest in their newly altered post-fire landscape. At the same time, offering an array of activities from minimal to maximum engagement is important for meeting the interaction preferences of a diverse public.

The notable number of participants who are simply unaware (responded *don't know*) about how agency personnel interact with local citizens is a third significant finding. This suggests an opportunity for local personnel to make a real difference in their community by reaching out to those who are undecided and possibly influencing attitudes about agency interactions. The number of *don't know* responses amounted to nearly one-third of participants for some survey questions in this study. Given these responses came from the attentive public, it is likely there

are a far greater number of ‘undecideds’ in these communities. Certainly many in this group simply are disinterested in the fire issue, but may become more concerned as other natural resource problems arise.

A pathway towards reaching this undecided population is to restructure citizen–agency communication strategies to focus on more personalised forms of public interaction (Cortner *et al.* 1998). For example, learning about local concerns and specific forest places of importance make the interaction more meaningful to participants and result in more positive public responses (Shindler and Neburka 1997; Winter *et al.* 2002). In a post-fire context where there is likely even greater uncertainty, this may be especially true. Indeed, study respondents indicated attention to local context (i.e. environmental consequences) was very important to them, and they found on-the-ground interaction activities such as field trips a useful way to engage with personnel. Over time, such activities also are likely to garner trust in decision-makers, which this research demonstrated is an important factor influencing public acceptance of agency actions and decisions.

A fourth notable finding is the large number of respondents indicating a decrease in trust in the agencies associated with how they managed after the fires. In one site, this was a majority, whereas at the other, the majority indicated trust stayed the same. One recent study suggests individuals who have experienced a fire on a more personal level may hold less trust in the managing agency (Cvetkovich and Winter 2008). However, it does not appear this rang true in our research. Respondents from the B&B site reported living closer to the fire boundary and were more likely to have been evacuated. Yet it was respondents from this site who indicated higher initial trust levels and less decrease in trust overall.

Another explanation for the overall decrease in trust across both sites is a failure in having authentic communications and methods to help citizens understand the decision-making process (Winter *et al.* 2004; Olsen and Shindler 2007; Liljeblad *et al.* 2009). Responses from the small number of respondents who indicated an increase in trust suggest good public interaction and communications skills were the primary reason for their positive assessment. Although scepticism exists among study participants about influence on local personnel from the national level, many concerns can still best be addressed at the local level. Citizens value the sincere and honest interactions and genuine discussion of both problems and solutions (Davenport *et al.* 2007; Burns *et al.* 2008) that is usually possible only at the local level. With the potential for more trusting relationships as a direct result of open and frank encounters, post-fire communities may experience reduced conflict, and an increase in cooperative behaviour, during planning processes (Rousseau *et al.* 1998; Burns *et al.* 2008).

A fifth noteworthy finding from this research is the considerable variance in opinion between the two study sites. Though some sentiments are similarly shared (e.g. lack of agreement with post-fire management, importance of trust in decision-makers), the significant differences between sites in agreement with most statements about citizen–agency interactions support earlier research in forest communities that a one-size-fits-all planning and management approach is not likely to be successful (Brunson and Shindler 2004). From the initial descriptions of these communities, one can see there are differences in the

size of the fire, management emphasis for local forests, and the type of interactions among stakeholders. Further, Biscuit respondents were significantly less likely to give managers carte blanche control over active post-fire management practices. It is highly likely that initial levels of trust and the decrease in trust overall played an important role in acceptance of management actions. Another key difference is the role the local economy plays in decision-making; Biscuit respondents indicated it was significantly more important, owing in part to local dependency among some residents on timber-related income. Although economic consequences were rated as one of the least important on the list of factors used in this survey, almost half (46%) of Biscuit respondents still feel strongly about its influence. Finally, the difference in ratings of agency actions between sites underscores the importance of acknowledging locality-specific social and environmental concerns (Brunson and Shindler 2004; Winter *et al.* 2004).

## Conclusion

Post-fire planning and decision-making for federal lands is a highly complex process, one that is affected by citizen trust, citizen–agency relations, and citizen acceptance of management strategies. These factors are not easily manifested; rather, they result from long-term relationships. For most personnel and local citizens, a fire event of the magnitude described in this study will be a first-time experience, making it even more difficult to reach consensus on a course of action. A central conclusion from this analysis is that people are generally willing to accept post-fire management practices, but they are much less trusting of the agencies to carry them out. It is likely that many people are withholding trust until they see if managers can make good on their word, and whether they agree with agency actions that play out on the ground (Shindler and Gordon 2005). People seem to agree that something needs to be done, but scepticism remains and the need for a well-crafted planning process and good leadership are fundamental to success.

Findings from this study also help us to understand more specifically the elements important to citizens. Clearly, respondents were not happy with citizen–agency interactions, and most indicated a loss of trust because of how post-fire management planning and decision-making was handled. Many who denoted a lost trust in the agencies cited reasons such as disappointment in the type of information used in decisions, which was further supported in this correlation analysis. Further, differences between the two study sites in this research suggest positive relationships may be more likely to develop from a long-term investment in relationships by engaging citizens in real problem discussion and deliberation, particularly when citizen–agency interactions are more personalised and include opportunities to address the issues face-to-face.

For managers, a first step would be to take the information from this study and engage local citizens, and discuss whether this is an accurate picture of their local community. From this initial discussion, managers and citizens can work together towards agreeing on the forest values that are most important in their community, the specific practices and alternatives that may be appropriate, as well as the likely outcomes of each, and how the planning process can best serve all interests.

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