Joint Fire Science Program Regional Consortia 2012 Evaluation Report

A National Cluster Evaluation of Consortia Process and Impacts

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Funded by a grant from the Joint Fire Science Program

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Executive Summary

The National Evaluation of the Joint Fire Science Program (JFSP) Consortia aims to assess the processes and outcomes of consortia programming at the aggregate level. This ongoing evaluation includes four key components: An online survey component, targeting the fire science information-related experiences and opinions of fire managers/practitioners, fire researchers/scientists, and members of the general public; a webmetrics component including quantitative and qualitative elements specifically focusing on the operation and impacts of individual consortia websites; an evaluation resource guide designed to assist consortia in evaluating their own individual activities; and a qualitative interview component exploring the perspectives and experiences of key consortia personnel as they relate to shared JFSP consortia programming and objectives. The current report presents results obtained from the **second wave (Wave 2)** of data collection for the online survey and webmetrics evaluation components.

All but two of the fourteen JFSP consortia participated in the online survey this year, actively recruiting participants between March 2012 and July 2012. A total of **1,309** individuals accessed the Spring 2012 online survey and agreed to participate. The majority of these individuals (72.4%; *n* = 948) responded to the Consumer survey frame (targeting managers/practitioners), 17.1% (*n* = 224) responded to the Producer frame (targeting researchers/scientists), and 10.5% (*n* = 137) responded to the survey frame intended for the General Public.

Most consortia are still in the beginning phases of programming, and six had just been recently funded at the time of the Spring 2012 survey distribution. Thus, Wave 2 survey results should primarily be viewed as a baseline assessment that will be used to track future consortia progress and impacts. The Spring 2012 survey was the first that included participants from the newly-funded consortia, and results were quite similar to those obtained from the 2011 (Wave 1) survey. The majority of respondents in all three survey frames reported favorable opinions and experiences regarding fire science information. Current results did, however, illuminate some potential areas for improvement. For instance, Consumer results indicate that many of these respondents experience difficulty in understanding fire science information and in applying that information to their specific problems (though overall perceptions of the ease of understanding and applying fire science information were still slightly positive). "*Fire science information is not available in one convenient place"* was selected as the top obstacle to accessing and applying fire science information by both Consumer and Producer respondents. Further, General Public respondents expressed relatively neutral (rather than positive, as was typical for most survey items) assessments of fire science information accessibility. As a baseline assessment for several consortia, it is important to note that these findings do not yet reflect the impacts of consortia programming, but rather the current situation that needs to be addressed.

> *"I really do not know where to start getting information."*
> -General Public Respondent

Many JFSP consortia have highlighted the importance of fostering positive relationships between Consumers and Producers of fire science information in attaining their overarching

> *"It is critical to help managers and scientists properly communicate so that new research is able to play a role in management decisions."*
> -Producer Respondent

goal of increasing fire science information accessibility and applicability. Wave 2 survey results indicated that both Consumer and Producer groups have favorable perceptions of one another. Managers/practitioners expressed a desire to collaborate with researchers/scientists, and vice versa. Yet, results also revealed a slight discrepancy between Consumers' perceptions of Producers and Producers' self-perceptions in terms of approachability. That is, though Consumers generally agreed that Producers were approachable, Producers rated *themselves* as even more approachable. Producers also expressed a greater willingness to collaborate (with Consumers) than did Consumers (with Producers). Increasing Consumer awareness of Producers' willingness to collaborate and study local problems may help facilitate communication between these two groups.

The Spring 2012 survey findings should be considered as a baseline assessment, as this was the first survey wave incorporating the six newly-funded JFSP consortia. The eight original JFSP consortia, however, have had more opportunities to reach and impact their target audiences during the past year. Thus, we felt it was appropriate to compare mean survey responses among those affiliated with the original consortia across survey Waves 1 and 2 in an effort to highlight any early changes or improvements. Independent samples t-tests conducted using data obtained from only those indentifying with original JFSP consortia did reveal some significant differences in mean survey item responses; these differences primarily emerged in the Consumer survey frame. Specifically, these analyses revealed the following positive changes among Consumer respondents``:

- Wave 2 Consumer respondents were significantly more likely than Wave 1 Consumer respondents to agree that *fire science information is easy to find* and that they *trust fire science research findings*
- Wave 2 Consumer respondents expressed a (significantly) greater willingness to collaborate with fire science information Producers than did Wave 1 respondents
- Wave 2 Consumer respondents were significantly more likely than Wave 1 respondents to agree that their consortium *has helped improve the accessibility of fire science information, has helped improve the use and application of fire science information in my region,* and *has helped improve policy regarding fire management in my region*
- Wave 2 Consumer respondents were significantly more likely than Wave 1 respondents to report visiting their consortium's website, and were more likely to agree that their consortium's site *organizes the information I need in one convenient place.*

"I think there's a lot of value in putting all of the information in one place. I find my information from several different places which makes finding and utilizing information less efficient and more time-consuming."
-Consumer Respondent

Although small, the above differences were statistically significant and are particularly encouraging given that most of the eight original JFSP consortia are still in the beginning phases of program implementation and refinement.

All eight originally funded JFSP consortia (those with established websites) submitted data for Wave 2 of the quantitative webmetrics evaluation component. Despite issues regarding missing and confounded data, quantitative webmetrics findings did indicate that consortia are successfully recruiting and retaining new site users; they also are making significant efforts to advertise their site to potential users. Interpretation of "page views," or data indicating the least and most popular site content was more challenging than expected. Yet, aggregate data revealed a clear user preference for easily accessible archived learning opportunities such as webinars; blogs, collections of research briefs, and events pages also were frequently accessed. Searchable databases and interactive features such as "Ask an Expert" components did not perform as well as expected. The relative low popularity of these features may be partially attributable to website configuration and lack of user awareness and/or direction. That is, features are "hidden" under other site tabs and thus users are not aware of them, features are not functional, or users are unsure of what to search for.

The qualitative webmetrics component seeks to obtain a more thorough understanding of the content, operation, and organization of individual consortia websites through an online survey of responses from consortia personnel who are highly involved with their website (e.g., PIs, Coordinators, Webmasters). Representatives from all fourteen JFSP consortia responded to the Wave 2 qualitative webmetrics survey, though only eleven consortia had established individual sites. Qualitative webmetrics survey findings indicate that all consortia sites (developing or established) have the same primary purposes and target audiences, and that the established sites include a variety of features designed to meet the needs of their target audiences. Results from both quantitative and qualitative webmetrics components as well as those obtained from online survey respondents suggest that increased efforts should be made to inform users of interactive site features (such as discussion forums and "Ask an Expert" features) and to ensure that such features are user-friendly and functional. There were notable differences in the

reported amount of time consortia spent on maintaining their sites and in the frequency of site updates. Representatives reporting spending more time maintaining their sites also reported more frequent site updates, and these sites generally received more visitor traffic than sites expending fewer resources on development and maintenance. Open-ended responses suggest that many consortia experience significant challenges in maintaining, expanding, and improving their websites that are largely attributable to lack of time, personnel, and/or resources.

Again, findings presented in this report are primarily intended as a baseline that can be used to track consortia progress toward their shared goals at the aggregate level. They do, however, illuminate some consortia strengths and challenges regarding improving fire science information delivery. Current results support continuing efforts and highlight issues meriting specific attention across consortia. Results from future waves of both the online survey and webmetrics components will help determine the extent of progress toward shared consortia goals.

"Our region needs fire science! We also need a clearinghouse of information relevant to our region. As a firefighter, fuels, weather, and topography aid me in my decisions on the fireline."

-Consumer Respondent

Introduction

During the past several years, there has been an increasing emphasis on accountability for federally funded programming. Programs must clearly demonstrate the impacts of their efforts in order to secure future funding and support; this is often best accomplished through theory-driven evaluations examining multiple facets of program activities and outcomes. To this end, the national cluster evaluation of the JFSP regional consortia employs a mixed-method approach grounded in the Logic Model to assess the processes and outcomes of consortia activities. As each consortium is diverse and in varying stages of development, the present evaluation is conducted at the aggregate level to track consortia progress toward their shared goals related to the enhancement of fire science delivery. Results are intended to 1) Assist the JFSP Board in determining how to improve and support future consortia performance and success; 2) Provide feedback concerning consortia progress toward their goals to help maximize the impacts of outreach and educational activities; and 3) Facilitate the development of JFSP Best Practices toward reaching consortia goals.

The national cluster evaluation of the JFSP is comprised of four components: A web-based survey targeting fire managers/practitioners, fire researchers/scientists, and members of the general public; a webmetrics piece involving the collection and analysis of both quantitative and qualitative data regarding the individual consortia websites; development and distribution of an evaluation resource guide intended to help consortia build capacity to conduct individualized evaluations; and interviews conducted with consortia PIs aimed at understanding the successes and challenges encountered in efforts towards increasing the accessibility and applicability of fire science information. Appendix A provides a timeline detailing past and expected future implementations of these evaluation components. As PI interviews will not be conducted until Fall/Winter 2012-2013, the current report focuses on the findings from the **second wave** of the online survey and webmetrics components of the JFSP consortia evaluation.

Many consortia are in the beginning phases of program development and implementation. Six JFSP consortia were established and funded during the late months of 2011. Thus, current results are primarily intended to provide a baseline assessment that will be compared with results from the third phase of this evaluation (to be conducted in 2013). During 2013, consortia will have increased opportunities to reach their target audiences through educational activities and other interventions; they also may be continually improving and expanding their websites. Results from Phase three of the evaluation, when considered in conjunction with the findings presented here, should prove especially valuable in assessing the impacts of consortia programming. More specifically, such comparisons will help illuminate the short-term (e.g., changes in awareness, knowledge, skills, motivations) and medium-term (e.g., changes in decision-making and behaviors) outcomes resulting from consortia outreach and educational activities.

This report begins with an overview of the online survey component of the JFSP consortia evaluation, which primarily focused on respondents' perceptions and behaviors regarding fire

science information accessibility and applicability. Implications of these findings are discussed with respect to both the primary identification of survey respondents and the relationships between the perspectives of respondents from different target populations (e.g., the relationships between Consumer and Producer responses). Results from statistical tests comparing mean responses across survey Waves 1 and 2 also are presented and discussed.

Next, this report summarizes results obtained from the webmetrics component of the JFSP consortia evaluation. Both quantitative and qualitative findings are presented and discussed. Many consortia have only recently launched their individual websites and begun collecting quantitative user data via analytics packages. Thus, these findings should again be considered as preliminary and a means of providing an initial understanding of consortia sites rather than as an indicator of consortia performance. Initial quantitative webmetrics findings suggest that consortia are effectively recruiting and retaining website users, and that website features and content are currently addressing the needs of several visitors. Qualitative data collected from consortia PIs and Coordinators reveal consistencies in website purposes and target audience, though considerable diversity is noted in reported means of website maintenance.

The findings presented here are intended to provide the JFSP Board and regional consortia with a basic understanding of the perceptions and experiences of fire science information Consumers, Producers, and the General Public with regard to the accessibility and applicability of fire science information. A coherent picture of consortia progress toward their shared goals and a more valid assessment of the outcomes of consortia activities in terms of the Logic Model will emerge following analysis of data obtained from the third phase of this national cluster evaluation, which will incorporate more comprehensive data obtained from all fourteen JFSP consortia. Yet, we hope that the current findings will prove valuable to consortia in ascertaining general attitudes and behaviors regarding fire science information accessibility and applicability, fire science information needs, and preliminary consortia successes and challenges encountered in striving toward their ultimate goal of enhancing fire science delivery.

Online Survey Component

The JFSP consortia are unique entities but share the same primary objective: To improve fire science delivery by increasing the accessibility and applicability of fire science information. Though each consortium has developed a unique set of outreach and educational activities intended to further this objective, many similarities emerge upon examining individual consortium goals as proposed to the JFSP Board. For instance, many aim to improve relationships between fire practitioners and scientists, provide more interactive learning opportunities for fire practitioners, and to synthesize and clarify current fire science research results. The online survey was developed in collaboration with consortia PIs and Coordinators to assess progress toward these and other shared goals, as well as the effectiveness of common consortia strategies aimed at facilitating goal attainment.[1]

As with other national evaluation components, the online survey aims to enhance continued understanding of the impacts, and obstacles consortia experience in striving towards shared goals. To achieve this understanding, new survey data must be collected at regular intervals. All consortia have the opportunity to redistribute the online survey each spring and are required to do so at least once every two years. Survey redistribution requirements and recommendations for each consortium depend upon their individual funding and renewal schedule. Thus, data collected during each annual wave of survey distribution will reflect a slightly different group of participating consortia. Slight modifications to help improve the survey may be made between annual distributions; however, the content will remain similar across waves to facilitate analyses of trends over time.

The online survey is intended as an aggregate assessment to account for consortia diversity. Despite annual variations in consortia participation, the overarching objective of the survey is to assess JFSP consortia progress toward their goals *as a whole*. Accordingly, this section focuses on reporting the comprehensive results obtained from the Spring 2012 online survey, which was distributed by all of the newly-funded consortia and six of the original consortia. Considering the recent establishment of six JFSP consortia, these results should primarily be interpreted as a "baseline" assessment of consortia progress toward their shared goals. In addition, these aggregate findings can help identify current strengths and gaps in consortia programming. We recognize, however, that these results are based on respondents representing consortia at various stages of funding. To this end, we also report on the trends observed in comparing results from Wave 1 of the online survey (distributed during Spring 2011 by the eight original JFSP consortia) with those obtained from Wave 2 of survey data collection.

Three frames of the Online Survey were developed in order to capture the perspectives and experiences of these distinct audiences. The first targets *Consumers* of fire science information, or fire managers/practitioners, whereas the second targets *Producers* of fire science information, or fire researchers/scientists. The third frame is intended for members of the general public which are essentially all other respondents who may be exposed to consortia

[1] Please refer to the 2010-2011 Report for Wave 1 results and a more comprehensive discussion of online survey development and design

outreach or educational activities but do not identify as fire science professionals. When possible, items in the Consumer and Producer survey were constructed to be complementary or parallel. The three survey frames, however, also contain many unique items and often use different language and phrasing. The General Public version in particular differs from the other two frames; it is more focused on basic experiences and preferences regarding fire science information. Thus, following a description of the survey methodology and participants, this section presents specific results for each frame separately.

Method

All of the newly-funded JFSP consortia and six of the original consortia actively recruited participants for Wave 2 of the online survey. Each participating consortium launched the survey between March 2012 and July 2012, at a time deemed most appropriate for a consortium depending on its stages of development, location, and fire season. "Contact lists" with potential participants' names and email addresses were used by each participating consortium for recruitment purposes; these were developed by compiling existing email lists, contacts from prior needs assessments, and registrants at websites and various educational activities. To reach as many participants as possible, a "snowball" sampling strategy was used, whereby existing contacts were encouraged to forward the survey invitation to any other qualified or interested participants. University of Nevada, Reno Institutional Review Board certification was sought and obtained for all data collection activities described in this report.

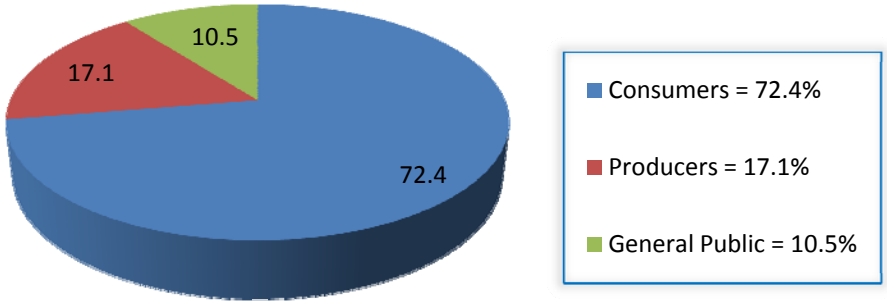
Recruitment followed the Dillman (2010) method, which recommends that participants receive three separate invitations to participate in survey research: An initial recruitment notice, a follow-up reminder, and a final reminder. All participating consortia forwarded these invitations via email (staggered across approximately six weeks, with two weeks between each distribution) to all those on their respective contact lists. Participants accessed the survey via the link included in all recruitment emails. Upon entering Survey Monkey (the online survey host site), participants were asked to select their primary identification (Consumers of fire science information, or managers/practitioners; Producers of fire science information, or researchers/scientists; or the General Public, encompassing landowners/community members not currently employed in a fire science profession). Based on these responses, participants were electronically directed to the appropriate survey frame. Participants subsequently responded to a variety of multiple choice items depending on survey frame. Upon completing the survey, participants were thanked and redirected to the JFSP website home page.

Participants

A total of **1,309** individuals accessed the Spring 2012 online survey and agreed to participate, and **1,080** (82.5%) of these participants completed the entire survey. Among those who began the survey, 72.4% (*n* = 948) identified themselves as Consumers of fire science information, 17.1% (*n* = 224) identified themselves as Producers of fire science information, and 10.5% (*n* = 137) identified themselves as the General Public/community members (see Figure 1).

Participant demographics (e.g., gender, age, ethnicity, and role) are reported below for each survey frame.

Figure 1. Primary Identification of Survey Respondents



All of the six newly-funded consortia and six of the original eight consortia actively recruited participants for the Spring 2012 survey. To minimize survey fatigue among their regional respondents, the Appalachian and Great Basin consortia were not required to redistribute the survey and thus did not actively recruit 2012 survey participants. Yet, many participants affiliated with these two consortia responded to the survey due to the snowball sampling procedure and regional geographic "overlap" across consortia. As a result, all of the 14 JFSP consortia were well-represented in the 2012 online survey.

Table 1 displays the frequencies of survey respondents per frame from each consortium. Consumer and Producer respondents were permitted to "select all that apply" when asked to indicate the consortium in which they worked. Thus, consortium affiliation as displayed in this table is not mutually exclusive. Approximately 21.3% of Consumer respondents selected more than one consortium. Multiple affiliations were much more common among Producers; nearly half (47.1%) of these respondents selected more than one consortium. It should further be noted that the frequency of responses for consortia are dependent on a variety of factors, including geographic location and size, stage of development, existing contacts and relationships within consortia, and differences among consortia with regards to resources and funding.

Table 1. Number of Online Survey Respondents by Consortium

Consortium	Consumer *N*	Producer *N*	Public *N*	Total *N*
Alaska	33	12	0	**45**
Appalachians	20	6	2	**28**
California	155	41	23	**219**
Great Basin	36	8	0	**44**
Great Plains	69	23	11	**103**
Lake States	48	14	5	**67**
Northern Rockies	41	13	2	**66**
Northwest	22	12	3	**47**
Oak Woodlands	93	29	5	**127**
Pacific	50	11	10	**71**
Southern Fire Exchange	139	29	23	**191**
Southern Rockies	61	13	11	**85**
Southwest	43	27	80	**78**
Tallgrass	107	30	11	**148**
National Level	8	7	0	**15**
Other	10	6	4	**20**

***Note:** These figures reflect the number of participants who completed the entire survey and explicitly identified their region via a multiple choice survey item.

Consumer Survey Results

Consistent with findings from Wave 1 of the online survey, Consumers were by far the most represented group of participants. Nearly three quarters (72.4%, *N* = 948) of total survey respondents primarily identified as Consumers of fire science information, working as fire managers, practitioners, or technical specialists. As Consumers are the primary target of consortia outreach and educational activities, the Consumer survey also is the most extensive of the three frames. Consumers were asked to respond to a variety of multiple choice items, including those targeting their experiences with fire science information and information producers; opinions and experiences regarding regional educational activities, their regional consortium, and their consortium's website; experiences with fire science information sources; and perceptions of obstacles to accessing and applying fire science information. As with the other survey frames, Consumer items primarily targeted consortia progress toward their shared goals, effectiveness of broader educational activities/interventions designed to increase fire science information access and applicability, and identification of strengths and challenges in improving fire science delivery. Whenever possible, items have been constructed to assess short- and medium-term outcomes of consortia programming in terms of the Logic Model (i.e., changes in awareness, knowledge, attitudes, motivations, behaviors, and policy/practices).

Consumer Demographics

Consumer survey respondents were primarily male (73.8%) and Caucasian (88.0%). Other reported ethnicities included Hispanic/Latino (3.4%) "Other" (2.5%); Asian/Pacific Islander (2.5%) American Indian (1.4%); Multi-Ethnic (1.1%); Black (.8%); and Alaskan Native (.3%). The mean age of Consumer survey respondents was 46.9 years.

Figure 2. Educational Background of Consumer Survey Respondents

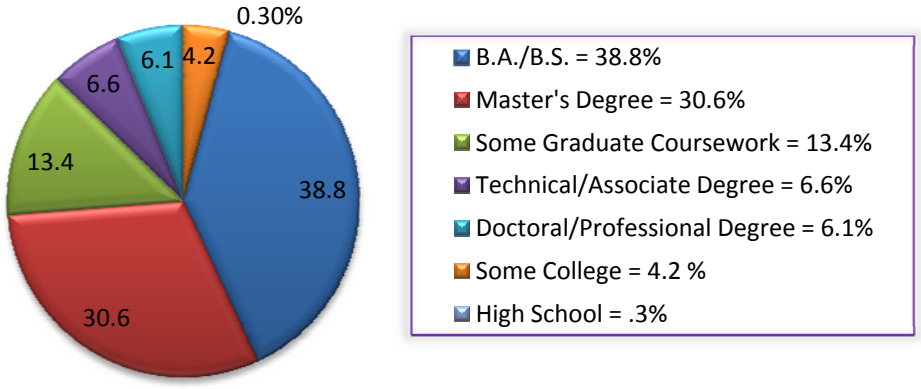


Figure 3. Primary Role of Consumer Survey Respondents

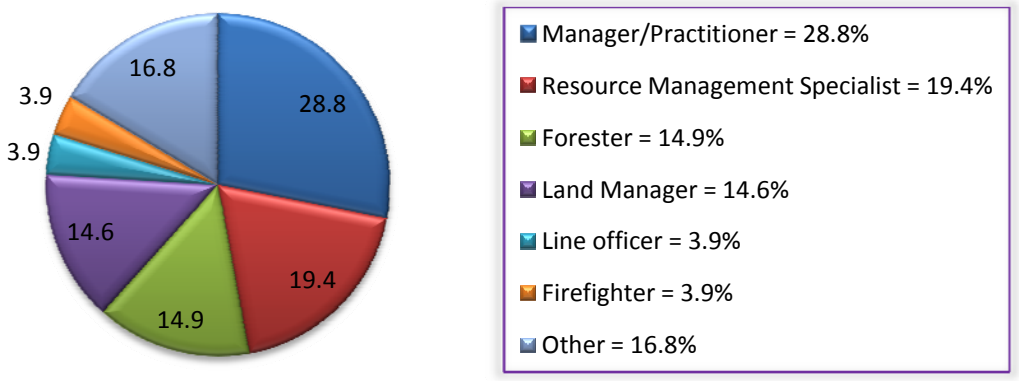
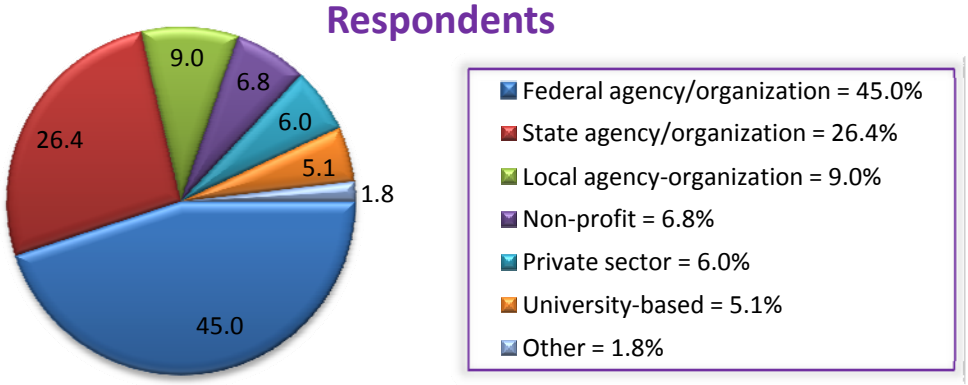


Figure 4. Affiliation of Consumer Survey Respondents



Consumer respondents were experienced and well-educated. Average reported length of time working as a fire practitioner/manager was 18.31 years, and the majority had earned a Bachelor's or post-baccalaureate degree (See Figure 2). Over one quarter of respondents (28.8%) described themselves as fire managers/practitioners; other reported roles included Resource Management Specialist (19.4%); "Other" (16.8%), which included range managers, graduate students, weather specialists, and a conglomeration of other specializations; Forester (14.9%) and Land Manager (10.4%; see Figure 3). Nearly half of Consumers were affiliated with federal organizations (45.0%), followed by state agencies/organizations (26.4%); local organizations (9.0%); and non-profits (6.8%; see Figure 4).

Experiences with Fire Science Information and Information Producers

The first section of the Consumer survey instructed participants to indicate their level of agreement with 15 statements targeting their perceptions and experiences concerning fire science information and fire science information producers. These items were designed to yield basic information regarding the accessibility and applicability of fire science research results and tools from the manager/practitioner perspective, as well as to help determine the extent to which increases in fire science knowledge impact decision-making and behaviors. In their proposals to the JFSP Board, most consortia emphasized the importance of fostering communication among Consumers and Producers of fire science information as a means of ultimately enhancing fire science delivery. Thus, several items in this section also focus on Consumers' perceptions and experiences regarding fire science information producers to obtain a better understanding of the relationships between these two groups. According to the Logic Model framework, most items were constructed to assess short-term (e.g., changes in beliefs, attitudes, awareness, and knowledge) and medium-term (e.g., changes in decision-making and behaviors) outcomes of consortia programming. Such changes and improvements will become more apparent following additional waves of survey distribution as further trend analyses are conducted.

Responses to all items in this section occurred on a 5 point Likert scale, where 1 = Strongly Disagree and 5 = Strongly Agree. Table 2 displays Consumers' mean responses to items targeting their basic experiences and opinions concerning fire science information. All mean responses occurred at the positive end of the scale, indicating relatively favorable evaluations of fire science information accessibility and applicability. Consumers expressed the strongest agreement with the statement, "Fire science information enhances my effectiveness on the job," and were least inclined to agree with the statement "Fire science information is easy to apply to my specific problems," though mean responses to this item still fell on the positive end of the scale. This is consistent with key issues highlighted by consortia in their funding proposals; namely, that Consumers face challenges in accessing fire science research results and tools relevant to their work and/or in translating and adapting extant fire science information for their own use.[2]

[2] Results from the 2012 Consumer survey frame (as well as those from the other two frames) are similar to those obtained from the 2011 survey. Analyses conducted by consortium affiliation (i.e., recently funded vs. original) indicate that results for the six most recently funded consortia did not significantly differ from the results of last year's survey, which targeted representatives from the eight original consortia. Some differences did emerge when comparing responses from the affiliates of the eight original JFSP consortia across Wave 1 and Wave 2; these will be further discussed in the Trend Analyses section.

Table 2. Consumer Perceptions and Experiences Regarding Fire Science Information Accessibility and Applicability: Mean Responses

Item	Mean (SD)
Using fire science information enhances my effectiveness on the job	**4.09** (.68)
Fire science information should be shared more frequently within my agency/organization	**4.08** (.75)
I trust fire science research findings	**3.83** (.65)
I often draw on fire science research when making work-related decisions	**3.68** (.84)
During the past year, I have changed at least one thing in my work based on what I've learned about fire science	**3.47** (.95)
Fire science information is easy to find	**3.42** (.84)
Fire science information is easy to understand	**3.35** (.80)
Fire science information is easy to apply to my specific problems	**3.18** (.85)

Table 3 displays Consumers' mean responses to items targeting their perceptions and experiences concerning producers of fire science information (i.e., fire science researchers/scientists). All responses to these items also fell at the positive end of the scale (with the exception of the negatively framed items), suggesting that Consumers have relatively favorable opinions of fire science information producers and their work. In particular, Consumers were eager to collaborate with fire researchers/scientists on research projects. Not surprisingly, they were less likely to indicate that they actually had worked jointly with researchers/scientists. Increased reports of collaboration among managers/practitioners and researchers/scientists are expected in future survey waves, as consortia efforts continue to establish and strengthen relationships between these two groups.

Table 3. Consumer Perceptions and Experiences Regarding Fire Science Information Producers: Mean Responses

Item	Mean (SD)
I would like to work/continue working jointly with fire scientists/researchers on research projects	**3.97** (.78)
Fire science researchers/scientists are willing to directly work with me if I have questions about research or how to apply fire science at my job	**3.37** (.74)
Fire science researchers/scientists are easy to approach	**3.37** (.75)
Fire science researchers/scientists value my knowledge and experience as a field professional	**3.35** (.82)
I have worked jointly with fire science researchers/scientists on research projects	**3.15** (1.13)
Fire science researchers/scientists are reluctant to study problems and issues suggested by local managers/practitioners*	**2.85** (.84)
Fire science researchers/scientists rarely provide information that helps me address the management problems I face*	**2.62** (.87)

***Note*: The last two items in this table are negatively framed. As all responses occurred on a 1 (Strongly Disagree) to 5 (Strongly Agree) scale, lower mean values on these items would indicate more positive perceptions and experiences regarding fire science information producers.

Consumer Experiences with Regional Fire Science *Activities*

Next, respondents were asked to indicate their level of agreement with a series of five statements regarding the effects of fire science-related activities within their region. Responses occurred on a 5 point Likert scale, where 1 = Strongly Disagree and 5 = Strongly Agree. Such activities are most likely the product of consortia programming. Some participants, however, were unaware of the existence of their regional consortium; thus, these items were phrased at a more general level.

Table 4 displays the mean responses to items targeting Consumers' general beliefs about regional fire science-related activities. Though all responses fell at the positive end of the scale, there was an inclination towards neutrality. This may be because some of these items assess more medium-term outcomes (i.e., changes in policy and practice), which often take several years to emerge after a program or intervention has been implemented. Considering that half of the consortia participating in Wave 2 had just been recently funded and established, it also is likely that some respondents were generally unfamiliar with formal regional endeavors to improve fire science information accessibility and applicability. Importantly, respondents were most inclined to agree with the statement that "A consortium is needed to help coordinate sharing of fire science information in my region."

Table 4. Consumer Opinions and Experiences Regarding Regional Fire Science-Related Activities

Item	Mean (SD)
A consortium is needed to help coordinate sharing of fire science information in my region	**3.93** (.83)
During the last year, my agency/organization has effectively collaborated with other agencies/organizations to access fire science information	**3.43** (.85)
During the last year, educational activities within my region have helped me to connect with researchers/scientists whose work is of interest to me	**3.25** (.94)
During the last year, fire science-related activities within my region have helped facilitate changes in fire management and/or policy	**3.18** (.16)
During the last year, fire science-related activities within my region have made it easier for my agency/organization to accomplish its goals	**3.12** (.82)

Items Regarding *Consortium* Efforts

Due to the varying developmental stages of the consortia, it was expected that several respondents would be unfamiliar with their regional consortium and its link to regional fire science activities and outreach efforts. Thus, prior to receiving any survey items explicitly referencing consortia, respondents were asked whether they were aware of a fire science and delivery Consortium supported by the Joint Fire Science Program in their region. Most were indeed aware of their regional consortium (71.9%) and were subsequently asked to respond to five items regarding their opinions and experiences about their consortium. The remaining 28.1% of respondents indicated that they were unaware of their regional consortium skipped these items and continued on to the next portion of the survey.

Responses to consortium-specific items occurred on a 5 point Likert scale, where 1 = Strongly Disagree and 5 = Strongly Agree. As shown in Table 5, all mean responses fell at the positive end of the scale, with some trending toward neutrality or uncertainty (e.g., *The Consortium has helped improve fire management policy in my region*). Again, this may be attributed to the time it takes for more medium-term outcomes to emerge or unfamiliarity with consortium efforts and their outcomes. As most respondents agreed that they would recommend consortium involvement to their co-workers, we expect to observe increases in knowledge about the regional consortia and their activities in subsequent survey waves.

Table 5. Consumer Opinions and Experiences Regarding their Regional Consortium

Item	Mean (SD)
I would recommend Consortium involvement to my co-workers	**3.90** (.74)
The Consortium has helped improve the accessibility of fire science information	**3.65** (.78)
The Consortium has helped improve communication among fire managers/practitioners and fire researchers/scientists in my region	**3.49** (.79)
The Consortium has helped improve the use and application of fire science in my region	**3.47** (.75)
The Consortium has helped improve policy regarding fire management in my region	**3.12** (.72)

Perceptions of Consortia Websites

A review of initial funding and renewal proposals reveals that all JFSP consortia aim to establish and continuously improve individual websites. These sites are extremely critical in fostering consortia progress toward their overarching goals. Lack of time and the observation that "fire science information is not available in one convenient place" are commonly cited obstacles to accessing and applying research results and tools. Consortia websites aim to organize fire science research results and resources in "one-stop shops" for busy fire science professionals and other interested users; they also inform users of continuing learning opportunities and consortia-sponsored activities. Websites incorporating interactive components (e.g., communication forums, features allowing managers/practitioners to submit questions to researchers/scientists) also may help foster relationships between fire science information Consumers and Producers.

The purposes and impacts of the consortia websites will be further discussed in the Webmetrics section of this report. Considering the importance of these websites in enhancing fire science delivery, however, we continued to explore Consumers' experiences and opinions regarding their consortium's website. In addition to some minor modifications to the multiple choice items regarding consortia websites, we added an open-ended question to the Spring 2012 survey to gather more detailed feedback from website users.

The consortia are all in varying phases of website development and improvement. All of the eight original consortia had established sites at least 6 months prior to Wave 2 of survey distribution (some of which had been launched up to two years ago), whereas all of the six newly-funded consortia were working to develop their sites. Thus, as with Survey Wave 1, it was expected that many respondents would not be able to report on their experiences with their consortium's website. Prior to receiving any website-related items, Consumers were first asked if they had visited their consortium's site. Over half (57.3%) indicated that they had and were subsequently asked to respond to relevant items. The remaining 42.7% of respondents

did not receive any other items about their consortium's website and were electronically redirected to the next portion of the survey.

Quantitative Consumer responses

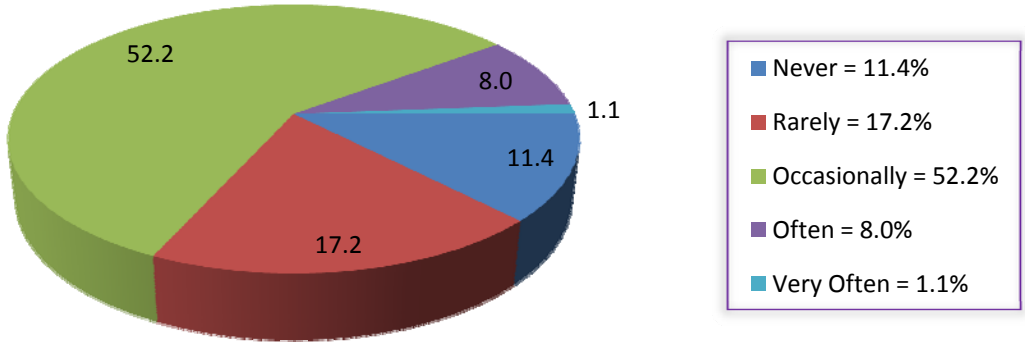
Respondents indicating that they had visited their consortium's website were next asked to respond to five Likert scale items where 1 = Strongly Disagree and 5 = Strongly Agree. Mean responses to this item set indicate that users were satisfied with site content, with most agreeing that their site provided a variety of current and practical information (see Table 6). Consumers also were asked whether their consortium's site included an interactive feature ("Does your consortium's website provide a forum where you can share information and ask questions?"). Most respondents were "not sure" if their consortium's site offered this type of feature (61.0%). Over one-third of respondents said that their consortium's site *did* provide an interactive forum (35.4%), and 3.6% specified that such features were not available on their consortium's site. Thus, though responses to website-specific items were generally quite positive they do suggest that consortia may wish to improve the general organization of fire science information within their sites and implement or promote interactive website components. That is, many sites may include interactive components, but users may be unaware of them.

Finally, users were asked to indicate how often they used information obtained from their consortium's website in their job during the past year on a 5-point Likert scale where 1 = Never and 5 = Very often. Results suggest that on-the-job applications of such information were relatively infrequent (*M* = 2.60, *SD* = .83; see Figure 5 for response frequencies). These findings, however, should be considered within the context of consortia website development. Many users likely only became recently aware of their consortium's site and therefore have had limited opportunities to visit the site, access and digest its content, and apply what they have learned in their job.

Table 6. Consumer Opinions and Experiences Regarding their Consortium's Website

Item	Mean (SD)
My Consortium's website provides information that is current and up-to-date	**3.77** (.70)
My Consortium's website provides a wide variety of fire science information	**3.72** (.70)
My Consortium's website provides practical information I can use in my job	**3.63** (.74)
My Consortium's website is user-friendly	**3.61** (.65)
My Consortium's website organizes the information I need in one convenient place	**3.50** (.74)

Figure 5. Consumers' reported frequency of applying information obtained via consortium websites on the job



Qualitative Consumer responses

After responding to the closed-ended items about their consortium's website, Consumers had the opportunity to provide suggestions, thoughts about website features or organization, or other experiences with the site. A total of 98 Consumers did so.[3] The most common themes expressed in such commentary are outlined as follows:

- **Awareness of their consortium's developmental phase and qualification of website-specific responses.** Numerous respondents specified that they represented consortia that had only recently launched their websites and emphasized that their responses to the prior closed-ended questions were qualified by their consortium's developmental stage (e.g., they could offer more well-informed responses once they became more familiar with their consortium's site and efforts). E.g., "*In all fairness, the website was recently launched, so much of it contains 'coming soon' placeholders*," "*We have two new consortiums in my area…I don't expect perfection out of the gate.*"

- **Suggestions for improving site organization and information syntheses.** Responses to both Waves 1 and 2 from the online survey revealed that "fire science information is not available in one convenient place" was the most commonly perceived obstacle to accessing and applying fire science research results and tools. Consistent with this concern, several Consumers commented about the organization of their consortium's site. Though such commentary is derived from experiences with different sites, it may help encourage all consortia to review and modify their site's organizational features and design as necessary. Some comments were more site-specific (e.g., "*It seems a little jumpy- you have to jump from one place to another via links on the website- some of which don't work-, and always have to go down another linked path to find information*"), whereas others were more generalized (e.g., "*Due to lack of time, I think*

[3] A thorough analysis of all commentary provided is beyond the scope of this report; however, upon request we can provide a complete text of all open-ended comments offered here and elsewhere in the report.

it is very important to organize information for quick and easy access…It is unfortunate, but I think many of us hit the abstract and "implications" portions of research and then read the rest if it seems applicable"). Similarly, some respondents suggested that additional information syntheses would benefit site users (e.g., "*Make sure information is summarized, viewable at a glance and linked to more detailed information to allow quick access. PDFs are great because they can be downloaded and referenced later*," "*Simplified summaries and application suggestions in addition to the research papers would help those of us trying to apply it"*).

- **Comments about webinars.** Several consortia have proposed increasing access to relevant webinars to help disseminate current fire science information and resources. Consumers' open-ended responses seem to reflect these efforts; though few mentioned specific products or learning activities, many mentioned webinars. Such commentary typically expressed appreciation for these learning opportunities and indicated that the webinars were helpful. E.g., *"Webinars on ecological applications of prescribed fire have been very helpful," "I do enjoy the webinars- good resources that point to links for fire behavior and fuels."* Some consortia sites archive past webinars for later viewing, which also was appreciated (*"I like having the webinars recorded for later viewing*"). Consortia that do not currently archive webinars on their websites may want to consider doing so, as some respondents indicated that webinars were scheduled at inconvenient times and requested that they be posted for later viewing.

- **Comments on interactive features.** Several Consumers mentioned their site's interactive features (or lack thereof), though few explicitly indicated that they had actually used them. E.g., "*I like the ask an expert feature, although I have not used it," "I like the forums, but I wish they would get more use and visitation."* One respondent said that he or she had tried to use an information sharing feature, but "*it was not very user-friendly and the information was never posted, so I never tried again."* Other Consumers recommended adding/improving interactive features (e.g., *"Would be great to get the Discussion forum set up as a place where managers can easily pose questions they are struggling with"*).

- **General positive feedback.** In addition to offering suggestions for improvement, many Consumers had favorable evaluations of their consortium's website and related efforts. E.g., *"Keep up the great work…" "Thanks to the consortium's efforts and website!" "It's a great way to share information," "Through (my consortium's) website I have been able to keep up with what has been happening in (my region) and connect with people that have helped me attend fire modeling workshops."*

This specific commentary on consortia websites represents a limited sample, and many of these respondents are likely more engaged with their consortium than the typical fire science information Consumer. Yet, commentary surrounding the basic themes above may be useful to consortia at varying phases in website development and expansion. This initial feedback suggests that consortia should continue to focus on enhancing site organization and making

their sites “user-friendly,” as well as providing easily accessible syntheses of the most current and regionally-relevant fire science research results. Commentary further indicated that the consortia efforts to increase exposure to web-based learning opportunities (i.e., webinars) have been successful, and that the webinars themselves have provided Consumers with useful information. Comments regarding site interactive features were a bit more diverse- though respondents generally favored such features, few reported direct experience with them. Moreover, most respondents were unsure if their consortium’s site actually offered such a feature (see above results for “Open-ended responses”). Thus, interested consortia may direct efforts toward enhancing their sites’ interactive features (e.g., working to maximize user-friendliness and prompt responses) and/or in encouraging users to take advantage of such features.

Experiences with Fire Science Information Communication Sources

The JFSP consortia have proposed and implemented numerous strategies for disseminating current and practical fire science information to Consumers. Such plans include the development and expansion of web-based sources of fire science information, synthesizing fire science information via newsletters, fact sheets, and brochures, and increasing the number of interactive and hands-on learning opportunities available to Consumers (e.g., workshops, conferences, field demonstrations). Accordingly, the online survey examined Consumers’ basic experiences with 11 common communication sources of fire science information. Consumers were first asked to indicate how often they had accessed information from each communication source during the last year; responses occurred on a 5 point Likert scale where 1 = Never and 5 = Very often. Next, Consumers were asked to rate the usefulness of the information they had accessed from each communication source on a 5 point Likert scale where 1 = Not useful and 5 = Very useful. Such responses may help focus consortia efforts towards disseminating fire science information via preferred and the most “useful” communication sources.

Table 7 displays Consumers’ mean responses to items assessing perceived usefulness of fire science information obtained from common communication sources and the frequency with which respondents accessed information via these sources. It should be noted that responses to these survey items were more variable than those to other survey items, as indicated by larger standard deviations. This may be partially attributable to differences in learning opportunities extended to Consumers, varying levels of exposure to communication sources, and individual learning preferences.

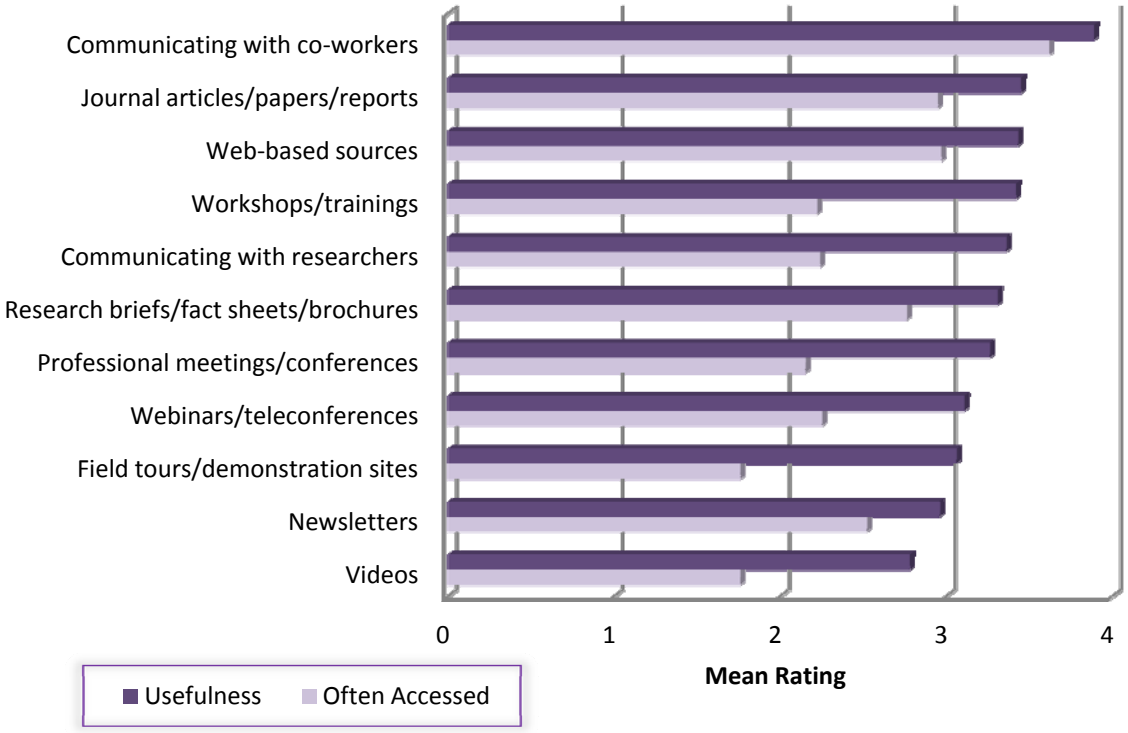
Table 7. Mean Ratings of Fire Science Information Communication Sources: Frequency of Access and Perceived Usefulness

Communication Source	Often Accessed Mean (SD)	Usefulness Mean (SD)*
Communicating with co-workers	**3.62** (1.25)	**3.89** (1.04)
Web-based sources	**2.97** (1.01)	**3.43** (1.10)
Journal articles, papers, or professional reports	**2.95** (1.02)	**3.31** (.98)
Research briefs, fact sheets, brochures	**2.76** (.95)	**3.22** (.94)
Newsletters	**2.52** (1.11)	**2.96** (1.01)
Workshops or trainings	**2.22** (1.03)	**3.42** (1.35)
Communicating with researchers/scientists	**2.24** (1.02)	**3.36** (1.29)
Professional meetings/conferences	**2.15** (.99)	**3.26** (1.31)
Webinars/teleconferences	**2.25** (1.16)	**3.11** (1.27)
Field tours/demonstration sites	**1.76** (.90)	**3.06** (1.48)
Videos	**1.87** (.93)	**2.78** (1.25)

***Note*: Because some Consumers had little or no experience with some of these fire science information sources (i.e., had never accessed during the past year), not all respondents provided usefulness ratings. *N*s for usefulness ratings ranged from 499 (*Field tours/demonstration sites*) to 764 (*Research briefs, fact sheets, brochures*).

As Figure 6 demonstrates, the top three most frequently accessed communication sources (*Communicating with co-workers, Web-based sources, Journal articles, papers, or professional reports*) also were rated as providing the most useful fire science information. These findings suggest that Consumers are receiving helpful information via highly accessible and time-effective sources; they also highlight the importance of inter-organization sharing of fire science information as *Communicating with co-workers* was the top rated source. More notable discrepancies occurred, however, between frequency of participation and ratings of usefulness for sources such as *Workshops/trainings* and *Communicating with researchers/scientists*. It is understandable that Consumers will have fewer opportunities overall to access such sources. Yet, these relatively high usefulness ratings support continuing efforts to offer more interactive learning opportunities and foster communication among fire science information Consumers and Producers.

Figure 6. Fire Science Information Communication Sources: Mean Ratings of Usefulness and Frequency of Access



Consumer Perceptions of Obstacles to Accessing and Applying Fire Science Information

In the final section of the Consumer survey, respondents were asked about their perceptions of obstacles to the accessibility and application of fire science information in their region. Specifically, they were presented with five potential obstacles, and instructed to indicate the extent to which they faced this obstacle in accessing relevant fire science information on a 5 point Likert scale where 1 = Strongly Disagree (that I face this obstacle) and 5 = Strongly Agree (that I face this obstacle). These items are included to help illuminate general strengths and gaps in consortia programming; results from future waves of the online survey can be used to determine if such gaps are being addressed effectively.

Table 8 displays Consumers' mean responses to items assessing their perceptions of obstacles to accessing and applying fire science information in their region. Responses trended towards neutrality, with Consumers only slightly inclined to agree that they faced all of these obstacles in accessing relevant information with the exception of *There is too much fire science information to digest/integrate*. These findings do not indicate any strong deficiencies in

consortia programming, but they do highlight the need for current consortia efforts in synthesizing and communicating fire science information. *Fire science information is not available in one convenient place* was the top-rated obstacle, suggesting that consortia focus on developing "one-stop shopping" websites is well-placed. These findings also suggest that consortia should aim to facilitate intra-organizational relationships and communication, in addition to promoting communication among Consumer and Producer groups.

Table 8. Obstacles Consumers Face in Accessing Relevant Fire Science Information

Obstacle	Mean (SD)
Fire science information is not available in one convenient place.	**3.32** (.88)
Lack of communication *between* agencies and organizations in my region decreases the accessibility of fire science information	**3.29** (.99)
I have few opportunities to communicate with fire science researchers/scientists	**3.25** (1.06)
Lack of communication *within* agencies and organizations in my region decreases the accessibility of fire science information	**3.21** (1.01)
There is too much fire science information available to digest/integrate	**2.76** (.96)

Producer Survey Results

The Producer survey frame is intended to complement to the Consumer frame and provide a more comprehensive understanding of JFSP consortia processes. Though many consortia efforts primarily target Consumers, Producers can provide further insight regarding the relations between Consumer and Producer groups as well as additional perspectives on their regional situation (e.g., perceived impact of consortia programming, obstacles in disseminating information). A total of **224** respondents (17.1% of the entire sample) self-identified as fire science researchers/scientists, and were thus directed to the Producer survey frame of the Spring 2012 survey. The Producer fame is somewhat similar in structure and content to the Consumer frame. Producers responded to items concerning their experiences with fire science information and fire science information Consumers, fire-science related activities within their region, and perceptions of obstacles to the dissemination of fire science information. Like Consumers, Producers also were asked about their experiences and opinions regarding their specific regional consortium and their consortium's website. The Producer frame is shorter than the Consumer frame, primarily targeting perspectives and behaviors regarding the dissemination of fire science research results as well as attitudes towards Consumers.

Producer Demographics

Most Producer respondents were male (65.3%) and Caucasian (90.9%). Other reported respondent ethnicities included Hispanic/Latino (3.0%); Other (2.4%); Multi-Ethnic (1.2%); and American Indian (.6%). The mean age of Producers was 45.18 years, and they had worked as researchers/scientists for an average of 15.22 years.

All respondents completing the Producer survey had earned a college degree. Over half (55.7%) held a Doctoral or Professional degree, and nearly one-third (30.1%) held a Master's degree (See Figure 7). Though most Producers strictly identified themselves as fire science researcher/scientists (68.2%), some were student scientists/researchers (13.6%), resource managers/specialists (5.1%), or indicated more specialized roles using the "other" category (e.g., weather, forester, research ecologist; 13.4%) . A University-based affiliation was most common (54.1%), followed by Federal agency/organization (32.0%); Non-profit (8.3%); State agency/organization (3.9%); and Private sector (1.7%).

Figure 7. Educational Background of Producer Survey Respondents

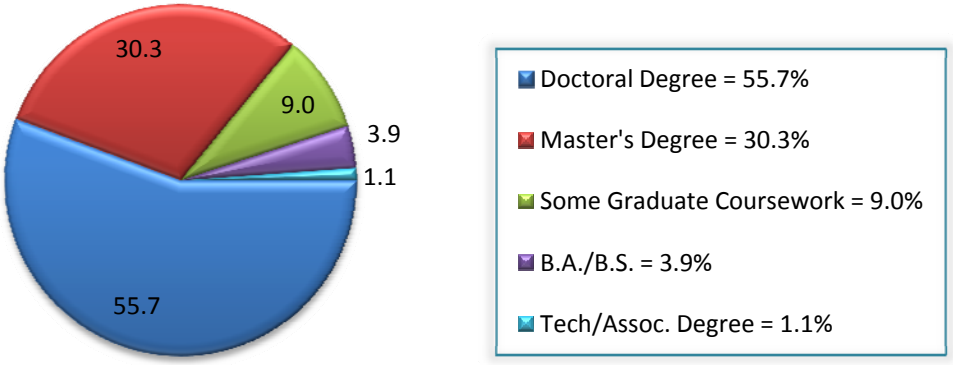


Figure 8. Primary Role of Producer Survey Respondents

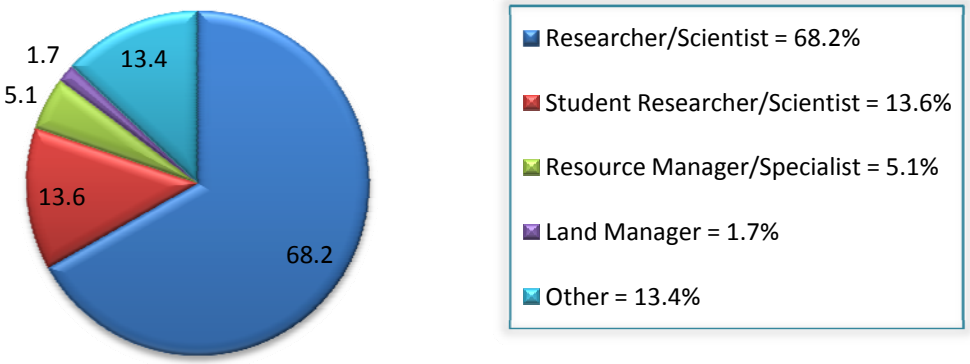
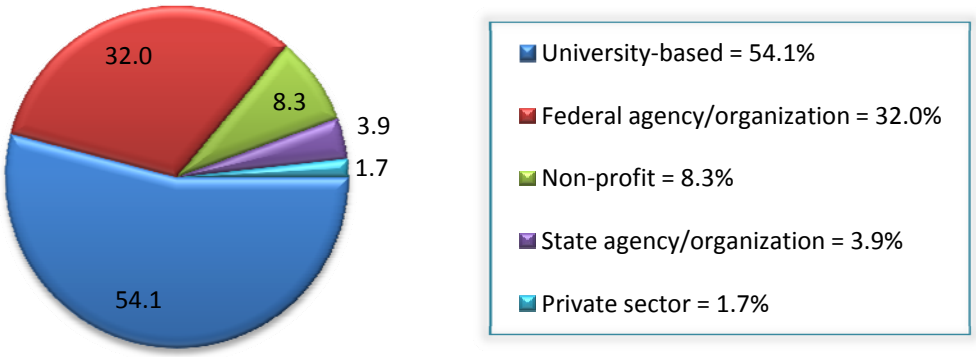


Figure 9. Affiliation of Producer Survey Respondents



Producer Experiences with Fire Science Information and Information Consumers

Producers were first asked to complete a series of 12 items concerning their "experiences with fire science information and Consumers of fire science information." Responses occurred on a 5 point Likert scale where 1 = Strongly Disagree and 5 = Strongly Agree. Several of these items were complementary to those appearing in the first section of the Consumer survey frame (e.g., Consumers were asked if they trusted fire science research findings whereas Producers were asked if they believed that Consumers trusted fire science research findings; both Consumers and Producers were asked about their desire to work with one another on research projects). Items in the Producer frame, however, were more focused on their willingness to research applied problems and to communicate findings to Consumer audiences. Consistent with the Logic Model approach to evaluation, items were constructed to assess short-term (e.g., changes in attitudes, beliefs, and behavior intentions) and medium-term (e.g., changes in actual behaviors) outcomes of consortia programming.

Producers' mean responses to items targeting their experiences with fire science information Consumers and their attitudes and practices regarding the study of applied issues are displayed in Table 9. Overall, Producers expressed favorable attitudes towards fire managers/practitioners and research endeavors targeting this population. No major inconsistencies were noted between Producer and Consumer responses to related items in this section (e.g., those assessing perceptions of one another and willingness to work together), but it is interesting to note that Producers provided slightly higher mean ratings on these items than Consumers (though Consumers' ratings were still favorable). For example, both groups agreed that they would like to work with one another on research projects, but Producers expressed a stronger desire to collaborate (M = 4.47; SD = .59; see Table 9) than did Consumers (M = 3.97; SD = .78; see Table 3). Further, though Consumers considered Producers to be approachable (M = 3.37, SD = .75), Producers rated *themselves* as even more approachable (M = 4.36, SD = .62). Although minimal, these differences suggest that there is some disconnect between the ways in which Consumers perceive Producers (regarding their approachability, willingness to collaborate and study applied problems, etc.), and Producers' self-perceptions.

Table 9. Producer Research Practices and Experiences with Fire Science Information Consumers

Item	Mean (SD)
Through my role as a researcher/scientist, I hope to improve how managers/practitioners make work-related decisions	**4.59** (.53)
I would like to work/continue working jointly with managers/practitioners on research projects	**4.47** (.59)
I make an effort to present information to managers/practitioners in a way that is easy to understand	**4.45** (.55)
Interacting with managers/practitioners enhances my effectiveness on the job	**4.37** (.65)
I consider myself approachable to managers/practitioners	**4.36** (.62)
I am willing to work directly with managers/practitioners to address their questions about fire science research or how to apply fire science research at their job	**4.35** (.67)
I have worked jointly with managers/practitioners on research projects	**4.19** (.69)
Managers/practitioners value my knowledge and experience as a fire scientist	**3.79** (.70)
I believe that managers/practitioners trust fire science research findings	**3.61** (.70)
I often present or publish fire science information for manager/practitioner audiences	**3.58** (.88)
I am sometimes hesitant to study problems and issues suggested by local managers/practitioners*	**2.24** (.89)
I prefer that my research be focused on theoretical issues, rather than on applied management problems*	**2.10** (.83)

***Note*:** The last two items in this table are negatively framed. As all responses occurred on a 1 (Strongly Disagree) to 5 (Strongly Agree) scale, lower mean values on these items would indicate an increased willingness to examine local and/or applied fire management issues.

Producer Experiences with Regional Fire Science Activities

Producers then responded to five items concerning their experiences with regional fire science-related activities, which were identical to those included in the corresponding Consumer survey frame section with one exception (*During the last year, educational activities within my region have helped me to connect with managers and on-the-ground fire personnel whose work is of interest to me*). As in the Consumer frame, these items primarily targeted opinions and experiences concerning *consortia-sponsored* activities, but the consortia were not explicitly mentioned due to some respondents' lack of familiarity with these partnerships and their programming. Responses occurred on a 5 point Likert scale where 1 = Strongly Disagree and 5 = Strongly Agree.

Like Consumers' responses, all Producer mean responses to these items fell at the positive end of the scale, but Producers mean responses were slightly more favorable (see Table 4 for Consumer responses and Table 10 for Producer responses). For instance, Producers were somewhat more likely to agree that *My agency/organization has effectively collaborated with other agencies/organizations to access fire science information* (*M* = 3.86, *SD* = .82) than were Consumers (*M* = 3.43, *SD* = .85). This distinction is not surprising considering that many Producers are likely more aware of/involved in programming efforts than Consumers due to the nature of their role. As expected, more neutral (but still positively-skewed) opinions emerged on items targeting more long-term outcomes related to policy and practice.

Table 10. Producer Opinions and Experiences Regarding Regional Fire Science-Related Activities

Item	Mean (SD)
A consortium is needed to help coordinate sharing of fire science information in my region	**4.12** (.84)
During the last year, my agency/organization has effectively collaborated with other agencies/organizations to access fire science information	**3.86** (.82)
During the last year, educational activities within my region have helped me to connect with managers and on-the-ground fire personnel whose work is of interest to me	**3.58** (.96)
During the last year, fire science-related activities within my region have helped facilitate changes in fire management and/or policy	**3.32** (.73)
During the last year, fire science-related activities within my region have made it easier for my agency/organization to accomplish its goals	**3.32** (.73)

Items Regarding *Consortium* efforts

As with Consumers, it was anticipated that some Producers would be unfamiliar with their regional consortium at the time of survey distribution, and thus not equipped to respond to consortium-specific items. Accordingly, Producers were first asked if they were aware of a fire science and delivery consortium supported by the JFSP in their region prior to receiving any items referencing the JFSP consortia. The majority (82.9%) of Producers indicated that they were aware of their regional consortium. These respondents were then asked to respond to five questions regarding their consortium's efforts, while the remaining 17.1% of respondents skipped these items and were electronically redirected to the next portion of the survey.

The consortium-specific items included in the Producer frame were identical to those in the Consumer frame, with responses occurring on a 5 point Likert scale where 1 = Strongly Disagree and 5 = Strongly Agree. Mean responses were relatively positive and similar to those obtained from Consumers. The majority of Producers agreed that they would recommend consortium involvement to their co-workers, but were a bit less certain regarding the effects of their consortium's activities on regional fire management policy (See Table 11).

Table 11. Producer Opinions and Experiences Regarding their Regional Consortium

Item	Mean (SD)
I would recommend Consortium involvement to my co-workers	**4.07** (.82)
The Consortium has helped improve communication among fire managers/practitioners and fire researchers/scientists in my region	**3.66** (.83)
The Consortium has helped improve the accessibility of fire science information	**3.65** (.82)
The Consortium has helped improve the use and application of fire science in my region	**3.46** (.83)
The Consortium has helped improve policy regarding fire management in my region	**3.11** (.73)

Perceptions of Consortia Websites

Most consortia websites target both Consumers and Producers of fire science information. Like Consumers, Producers may use their consortium's site to access current fire science research results, obtain information on learning and funding opportunities, and to network with other fire science professionals. In addition, interactive Consortia websites may provide more efficient means for Producers to share information regarding their current research projects and facilitate the application of their knowledge and expertise to Consumer problems.

Most Producers (66.1%) indicated that they had visited their consortium's website, and subsequently responded to six website-specific items using a 5 point Likert scale where 1 = Strongly Disagree and 5 = Strongly Agree. Some of these items were identical to those included in the Consumer survey frame (e.g., *My Consortium's website is user-friendly; My Consortium's website provides a wide variety of fire science information*), whereas some differed according to the specific needs of Producers (e.g., *My Consortium's website helps keep me informed of current research findings; My Consortium's website provides a way for me to share my research products or fire science delivery activities*).

Producers' mean responses to these website-specific items are displayed in Table 12. Most Producers agreed with Consumers that their consortium's site was user friendly and provided a wide variety of fire science information. A substantial degree of neutrality was expressed by Producers responding to these items, however. As with Consumer responses, this is likely attributable to the varying stages of site development and Producers' lack of familiarity with the sites. Though nearly one-third of Producers (32.7%) confirmed that their consortium's site provided a forum to share information or ask questions, over half (57.5%) were unsure if such features were offered. The remaining 9.7% said that no interactive features were included in their consortium's site.

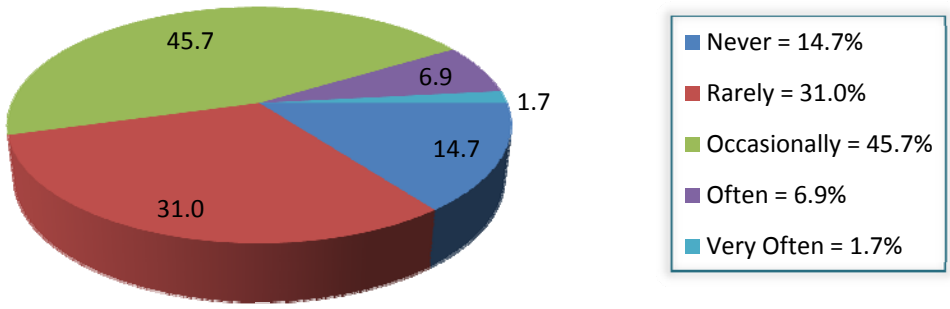
Like Consumers, most Producers said that they had "occasionally" (45.7%) or "rarely" (31.0%) used information obtained from their consortium's site at their job during the past year (*M* = 2.50; *SD* = .89; see Figure 10). Again, the recent establishment of many consortia sites may partially account for the lower reported frequencies of actually applying this web-based information; Producers may have had few opportunities to visit the sites throughout the past year, and/or many site components may have been incomplete. Producers' open ended comments about their consortium's site seem to support this explanation (e.g., *"I've not spent enough time on the site to develop a solid opinion," "My consortium is still getting up and running, so there is not a lot of information available on the webpage"*).[4] In addition, much of the fire science information these sites provide is likely intended for Consumer applications.

Table 12. Producer Opinions and Experiences Regarding their Consortium's Website

Item	Mean (SD)
My Consortium's website is user-friendly	**3.72** (.67)
My Consortium's website provides a wide variety of fire science information	**3.64** (.79)
My Consortium's website helps keep me informed of current research findings	**3.62** (.82)
My Consortium's website organizes fire science information and other useful tools in one convenient place	**3.53** (.82)
My Consortium's website provides a way for me to share my research products or fire science delivery activities	**3.46** (.77)

[4] Because Producers provided a relatively small number of open-ended comments about their consortium's website (*n* = 22), they will not be discussed in detail here. Upon request, we can provide the complete text of all Producer commentary.

Figure 10. Producers' reported frequency of applying information obtained via consortium websites on the job



Producer Perceptions of Obstacles to Fire Science Information Dissemination and Application

As described earlier, Consumers were asked about their perceptions of obstacles to accessing and applying fire science information. Because Producers focus on the development, execution, and distribution of fire science research, they were correspondingly asked to share their perceptions of obstacles related to the effective *dissemination* and application of fire science information. Again, these items are intended to highlight initial gaps and strengths in consortia performance related to the overarching objective of improving fire science delivery. Data obtained from further survey distribution waves can help determine the extent to which strengths are being maintained and/or enhanced and to which gaps are being addressed.

Producers responded to these items using a 5 point Likert scale where 1 = Strongly Disagree and 5 = Strongly Agree. Producer items were similar to those included in the Consumer survey, with the exception of *Managers/practitioners seem unreceptive or disinterested in current fire science research and information* (see Table 13 for Producer mean responses). Both Producers and Consumers identified the same two top obstacles to the dissemination (accessibility) and applicability of fire science information: Lack of availability of fire science information in one convenient place, and lack of communication *between* agencies/organizations. Consistent with Wave 1 survey results, most Producers did not implicate lack of opportunities to communicate with mangers/practitioners as an obstacle to fire science information dissemination and application. Consumers, however, were a bit more inclined to cite limited communication opportunities as an obstacle. Thus, consortia should continue in their efforts to increase Consumer awareness of such opportunities (e.g., via professional meetings/conferences, workshops, or interactive websites) and of Producers' willingness to work with fire managers/practitioners.

Table 13. Producer Perceptions of Obstacles to the Dissemination or Application of Fire Science Information

Obstacle	Mean (SD)
Fire science information is not available in one convenient place.	**3.57** (.82)
Lack of communication *between* agencies and organizations in my region decreases the accessibility of fire science information	**3.47** (.91)
Lack of communication *within* agencies and organizations in my region decreases the accessibility of fire science information	**3.35** (.83)
Fire scientists/researchers have few opportunities to communicate with managers/practitioners	**2.97** (1.02)
Managers/practitioners seem unreceptive or disinterested in current fire science research and information	**2.71** (.93)

General Public Survey Results

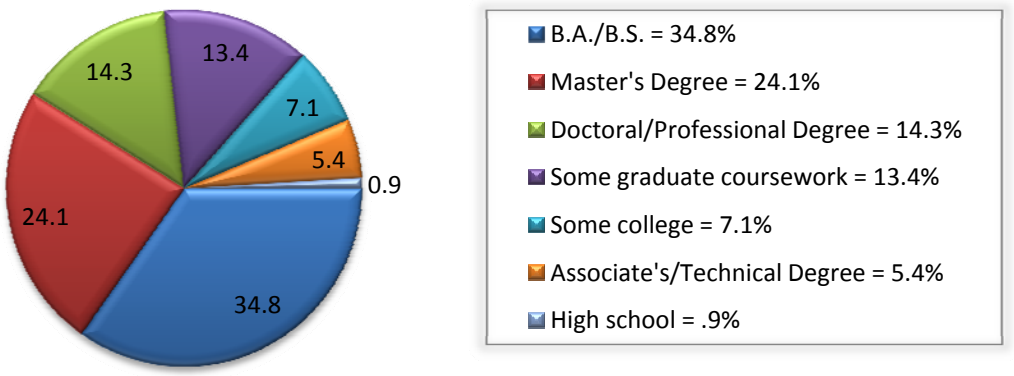
The General Public survey frame was intended for all other target audiences of consortia efforts and activities who were not primarily employed in fire management or research-related fields. This audience is highly diverse, including homeowners, large and small private landowners, retired fire science professionals, elected officials/decision makers, and other interested community members. The term "General Public" may be somewhat misleading, as respondents to this frame tended to have more education than the average community member, and many had occupational and/or educational backgrounds in fire science-related fields (but were not currently employed in such professions). Understandably, those most affected by wildfire and those most interested in fire science-related issues also would be more likely to be exposed to consortia educational and outreach efforts (and hence more likely to participate in the online survey). It is important to note, however, that the majority of General Public respondents categorized themselves as large or small private landowners.

Only a few consortia have specific plans to increase fire science information accessibility and applicability among the "General Public," which again encompasses a variety of populations. Consequently, the General Public survey is the smallest of the three frames, both in number of respondents **(*N* = 137)** and in scope. Most General Public respondents identified with the Southern Fire Exchange (20.9%) or the California (20.0%) consortia (see Table 1 for specific Participant x Consortium breakdowns). This survey frame contains two main item sections: one focusing on experiences with fire science information, and the other assessing perceptions and experiences concerning various sources of fire science information.

General Public Demographics

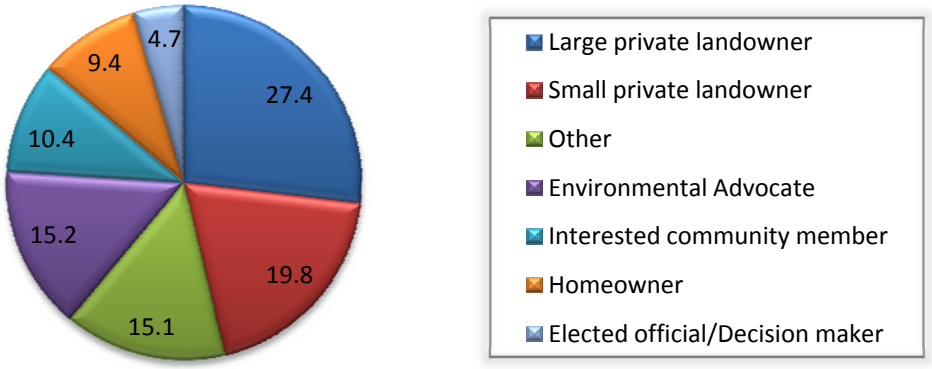
Over three-quarters (75.2%) of General Public respondents were male. Most were Caucasian (86.1%), followed by "Other" (4.3%); Asian/Pacific Islander (3.5%); Hispanic/Latino (2.6%); American Indian (1.7%); Black (.9%); and Multi-Ethnic (.9%). The mean age of participants was 55.41 years. Most General Public respondents were well-educated. Over one-third (34.8%) held a B.A./B.S., 24.1 % earned a Master's Degree, and 14.3% earned a professional or doctoral degree.

Figure 11. Educational Background of General Public Survey Respondents



Respondents indicated a wide variety of roles, demonstrating the diverse nature of the General Public survey sample (see Figure 12). Over one-quarter (27.4%) of respondents primarily identified themselves as large private landowners, 19.8% identified themselves as small private landowners, 13.2% were "environmental advocates," and another 10.4% were "interested community members. Approximately 15% of General Public respondents did not explicitly identify with any pre-determined response categories and selected the "Other" option. In elaborating on their "Other" role, respondents generally indicated significant involvement with fire science-related issues (e.g., *"Employed by an environmental non-profit*," "*conservation manager"*). 3

Figure 12. Primary Role of General Public Survey Respondents



General Public Experiences with Fire Science Information

General Public respondents were first asked to respond to a series of 13 items concerning their experiences with fire science information and fire management issues using a 5-point Likert

scale where 1 = Strongly Disagree and 5 = Strongly Agree. Some of these items were similar to those in the Consumer survey frame, targeting the ease of accessing and understanding fire science information. Whereas many of the Consumer items referenced work-related practices, however, General Public items targeted beliefs, opinions, and behaviors regarding fire science information at a broader level. For instance, General Public respondents were asked about their basic awareness of fire science/management issues, their intentions for applying fire science information, and the degree to which they shared fire science information with others.

General Public respondents' mean responses to the first series of items are displayed in Table 14. As was the case with Wave 1 findings, Wave 2 findings indicate a strong interest among the General Public to learn more about fire science/management issues. General Public respondents reported positive perceptions of fire science information regarding usefulness and trustworthiness. They also reported actively applying and sharing their fire science knowledge. These findings may constitute initial evidence of consortia impacts on both short-term (e.g., attitudes, knowledge) and medium-term (e.g., behavioral intentions, behaviors) outcomes.

General Public respondents were least likely to endorse the statement, "Fire science information is easy to find" (though mean responses still fell at the positive end of the scale). This suggests that consortia should continue efforts to increase awareness of convenient means of obtaining fire science information among the General Public. Continued promotion of consortia websites should help enhance the General Public's access to fire science information. Consortia targeting members of the General Public without web access may need to consider alternate strategies to facilitate ease of accessing fire science information.

Table 14. General Public Experiences with Fire Science Information and Fire Management Issues

Item	Mean (SD)
I am interested in learning more about fire science/fire management issues	**4.23** (.73)
I have shared or discussed information that I have learned about fire science with others	**4.08** (.79)
Overall, the fire science information available to me has been useful.	**4.07** (.72)
The fire science information I have received seems trustworthy and credible	**4.03** (.75)
I plan to use what I've learned about fire science to protect my home/land/community	**4.01** (.88)
I am concerned about the effects of fire on my environment	**3.92** (1.01)
I have changed one or more of my behaviors as a result of what I have learned about fire science	**3.90** (.86)
Fire science information is relevant to my needs	**3.87** (.87)
I am concerned about fire danger in my community	**3.83** (1.22)
My awareness of fire science/fire management issues has increased during the past year	**3.72** (.98)
Educational materials about fire science (e.g., fact sheets, videos, web-based) are easy to understand	**3.60** (.91)
Fire science information is easy to find	**3.13** (.97)
*I'm unsure of where to go or who to contact if I have questions about fire science or fire management issues	**2.63** (1.15)

***Note*: The last item in this table is negatively framed. As all responses occurred on a 1 (Strongly Disagree) to 5 (Strongly Agree) scale, lower mean values indicate *more* certainty about where to go/who to contact regarding fire science/management issues.

General Public Experiences with Fire Science Information Communication Sources

Like Consumers, General Public respondents completed a series of items about their experiences with a variety of fire science information communication sources. Specifically, they were asked to indicate the frequency with which they accessed information from seven different communication sources during the past year using a 5 point Likert scale where 1 = Never and 5 = Very often. In addition, they were asked to rate the usefulness of information they had received from each communication source, with responses occurring on a 5 point Likert scale where 1 = Not useful and 5 = Very useful. These responses may help consortia tailor their outreach and educational efforts according to community members' preferred communication sources and highlight any limitations in source accessibility.

Table 15 displays General Public mean responses to items concerning their experiences with fire science information communication sources; these results also are graphically depicted in Figure 13.[5] The sources rated as most helpful were often, but not always, among the most frequently accessed. For instance, the General Public respondents rated *Communicating with fire management/extension professionals* as the most useful source of fire science information; they also had relatively high ratings of the usefulness of *Group instruction, classes, or demonstrations*. Thus, like Consumers, it appears that the General Public respondents benefit from more interactive learning opportunities, though engagement in such opportunities is understandably limited by time and resource constraints.

Internet was the most frequently accessed source, and also was rated as the second most useful source of fire science information. A follow-up survey question asked General Public respondents whether the fire science information they received from web-based sources was current and up to date. Most respondents agreed (47.1%) or strongly agreed (14.3%) that the information they accessed from web-based sources was current; 22.7% of responses were "neutral," whereas 3.4% strongly disagreed and 2.5% disagreed that such web-based information was current and up-to-date. Approximately 10% of General Public respondents reported that they had not accessed fire science information from web-based sources. Taken together, these findings highlight the importance of consortia websites in enhancing fire science delivery among members of this diverse group. As the vast majority of General Public respondents reported using the internet to obtain fire science information, promoting consortium sites (and, for those consortia targeting the General Public, offering relevant information and resources) may be conducive to increasing fire science information accessibility and application.

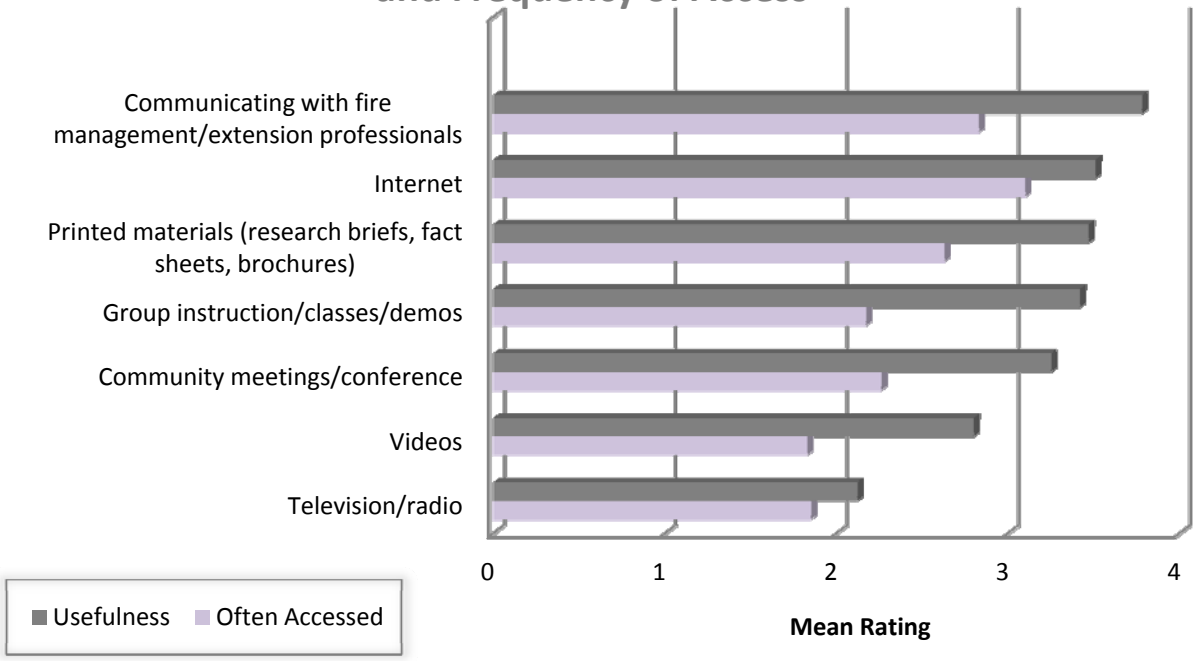
[5] As General Public Respondents were likely unfamiliar with some of the communication sources more common to Consumers (e.g., Professional *meetings*/conferences, field demonstrations), they were asked about their experiences with seven different sources rather than 11 (as in the Consumer survey). Due to role differences, several communication sources presented to the General Public also differed from those presented to Consumers.

Table 15. General Public Mean Ratings of Fire Science Information Communication Sources: Frequency of Access and Perceived Usefulness

Communication Source	Often Accessed Mean (SD)	Usefulness Mean (SD)*
Communicating with fire management/extension professionals	**2.83** (1.14)	**3.78** (1.21)
Internet	**3.10** (1.01)	**3.51** (1.01)
Printed materials such as research briefs, fact sheets, and/or brochures	**2.63** (.96)	**3.47** (.96)
Group instruction/classes/demonstrations	**2.17** (1.05)	**3.42** (1.42)
Community meetings or conferences	**2.26** (.98)	**3.25** (1.34)
Videos	**1.83** (.88)	**2.80** (1.24)
Television/radio	**1.85** (.94)	**2.12** (1.01)

***Note*: Because some General Public respondents had little or no experience with some of these fire science information sources (i.e., had never accessed during the past year), not all respondents provided usefulness ratings. The number of respondents for usefulness ratings ranged from 82 (*Videos*) to 114 (*Internet*).

Figure 13. Fire Science Information Commincation Sources: General Public Mean Ratings of Usefulness and Frequency of Access



Online Survey Component: Trends across Wave 1 and Wave 2

Results from both Wave 1 and 2 of the online survey are primarily intended to provide a more holistic understanding of the current *situation* of fire science delivery across consortia. We hope that this initial understanding of respondents' fire science information needs, opinions, and experiences will help inform future consortia programming. The other main purpose of the online survey, however, is to actually track consortia progress at the aggregate level and to detect any situational changes (e.g., in fire science information needs, in organizational and professional relations) that occur as consortia continue to develop, grow, and expand programming.

It takes time for the impacts of programming to emerge. This is particularly true for more medium-term outcomes such as changes in behaviors and particularly long-term changes such as responsive public policy. Since six consortia were just recently funded and all fourteen consortia are in varying developmental stages, data from future online survey waves are needed to provide a clearer picture of aggregate progress and impacts. Yet, the eight original JFSP consortia were implementing and executing programming throughout the year between survey waves (and several were active prior to Wave 1 distribution). Thus, we believe it is appropriate to examine potential trends across Survey Waves 1 and 2. There were no significant differences in responses to the General Public survey frame across waves. Analyses did reveal several significant differences in Consumers' mean responses, and two differences in Producers' mean responses. These are presented below.

Consumer Trends

Consumer trends were explored by comparing mean item responses across survey waves using Independent samples t-tests. Only responses from individuals identifying with the eight original consortia were included in analyses. That is, all Consumer data collected from Wave 1 served as a baseline for comparison with Wave 2 data provided by Consumers affiliated with any of the original JFSP consortia. Wave 2 respondents only affiliated with one (or more) of the six recently funded consortia were excluded from comparative analyses since the newer consortia are only beginning to develop and implement programming. Some Wave 2 respondents (n = 67) were affiliated with both original and recently funded consortia. These individuals were included in analyses because it was expected that they had some opportunity to be reached by consortia programming (i.e., via the original eight), whereas individuals who only identified with a recently funded consortium may not yet have had such opportunities. A total of **777** of Wave 1 and **494** of Wave 2 Consumer respondents were included in comparative analyses, though these numbers vary according to the specific item examined.

Independent samples t-test results are presented for each Consumer survey sub-section that included items yielding significant results. Though comparisons of Wave 1 and 2 mean responses did not yield significant differences for many items, it should be noted that positive

trends were observed across nearly all measures. Further, most of the significant differences that did emerge were relatively small, which is expected given: 1) The limited time that the eight original consortia have had to execute programming and impact respondents; and 2) The relatively positive responses of Wave 1 respondents (i.e., because many respondents initially had favorable experiences and opinions regarding fire science information, the current item response scales cannot detect large positive changes).

Experiences with Fire Science Information and Producers

Independent samples t-tests revealed two significant differences among Consumer perceptions of fire science information across waves.

- First, Wave 2 respondents (M = 3.54, SD = .78) were significantly more likely than Wave 1 respondents (M = 3.37, SD = .83) to agree that *fire science information is easy to find*, t (1,092) = 3.67, $p < .001$.
- Second, Wave 2 respondents (M = 3.85, SD = .63) were significantly more likely than Wave 1 respondents (M = 3.77, SD = .67) to report that they *trust fire science research findings*, t (1,096) = 2.17, $p < .05$.
- In addition, Wave 2 respondents expressed a greater desire to *work/continue working jointly with fire researchers/scientists on research projects* (M =4.0, SD = .75) than did Wave 1 respondents (M = 3.90, SD = .75). Though this difference was small in magnitude, it did reach statistical significance, t (1,056) = 2.37, $p < .05$.

Opinions and Experiences Regarding Regional Fire Science Consortia

No significant differences were observed in Consumers' responses to the five items regarding perceptions of "regional fire science-related activities." Yet, analyses did reveal small but significant differences in responses to three of the five items targeting Consumer's perceptions of their specific consortium. It should be noted that only individuals indicating that they were "aware of a fire science and delivery consortium in their region" responded to this latter item set. Appropriately, the percentage of Consumers (identifying with an original consortium) aware of their regional consortium was higher in Wave 2 (73.5%) than in Wave 1 (67.8%). The overall Wave 2 sample was smaller, however, so that approximately **371** Wave 2 respondents and **519** Wave 1 respondents responded to items specifically asking about opinions and attitudes regarding their consortium.

- Wave 2 respondents (*M* = 3.82, *SD* .74) were significantly more likely than Wave 1 respondents (*M* = 3.63, *SD* = .78) to agree that their *consortium has helped improve the accessibility of fire science information*, *t* (799) = 3.77, *p* < .001.
- Wave 2 respondents (*M* = 3.64, *SD* = .72) also were more inclined to believe that their *consortium has helped improve the use and application of fire science information in my region* than were Wave 1 respondents (*M* = 3.47, *SD* = .74), *t* (886) = 3.53, *p* < .001.
- Finally, there was a significant increase in agreement with the statement that *the consortium has helped improve policy regarding fire management in my region* from Wave 1 (*M* = 3.02, *SD* = .73) to Wave 2 (*M* = 3.18, *SD* = .80), *t* (745) = 2.96, *p* < .01..

Opinions and Experiences Regarding Consortia Websites

Only respondents who indicated that they had visited their consortium's website received items specific to their experiences with these sites. Less than half (48.4%) of Wave 1 respondents reported visiting their consortium's website, but approximately 64.3% of Wave 2 respondents (affiliated with one or more of the eight original JFSP consortia) said that they had accessed their consortium's site. Again, as the number of Consumer respondents was higher for Wave 1, our comparative sample for consortia website items consisted of approximately **377** Consumers in Wave 1 and **322** Consumers in Wave 2.

Independent samples t-tests yielded significant differences for four of the five items included in both Waves 1 and 2 (see Table 15 for results). Compared to Wave 1 respondents, Wave 2 respondents were more likely to agree that their consortium's website provides a wide variety of fire science information and that this information is current and practical (e.g., can be used on the job). Agreement with the statement that *my consortium's website organizes the information I need in one convenient place* also significantly increased across waves. These mean increases were small and may be partially attributable to Consumers' increased familiarity with their consortium's site. Yet, current results do suggest that consortia websites are developing and expanding according to their objectives of providing users with "one-stop shopping" for current and relevant fire science information.

Table 15. Significant Differences in Consumers' Mean Responses to Website Items across Survey Waves 1 and 2

My Consortium's website…	Wave 1 Mean (SD)	Wave 2 Mean (SD)	*t**
Provides information that is current and up-to date	**3.75** (.72)	**3.89** (.62)	**3.11**
Provides a wide variety of fire science information	**3.71** (.61)	**3.84** (.63)	**2.68**
Provides practical information I can use in my job	**3.59** (.72)	**3.76** (.69)	**3.11**
Organizes the information I need in one convenient place	**3.44** (.74)	**3.59** (.72)	**2.65**

***Note*:** Degrees of freedom ranged from 685 to 693. All *p*s < .01.

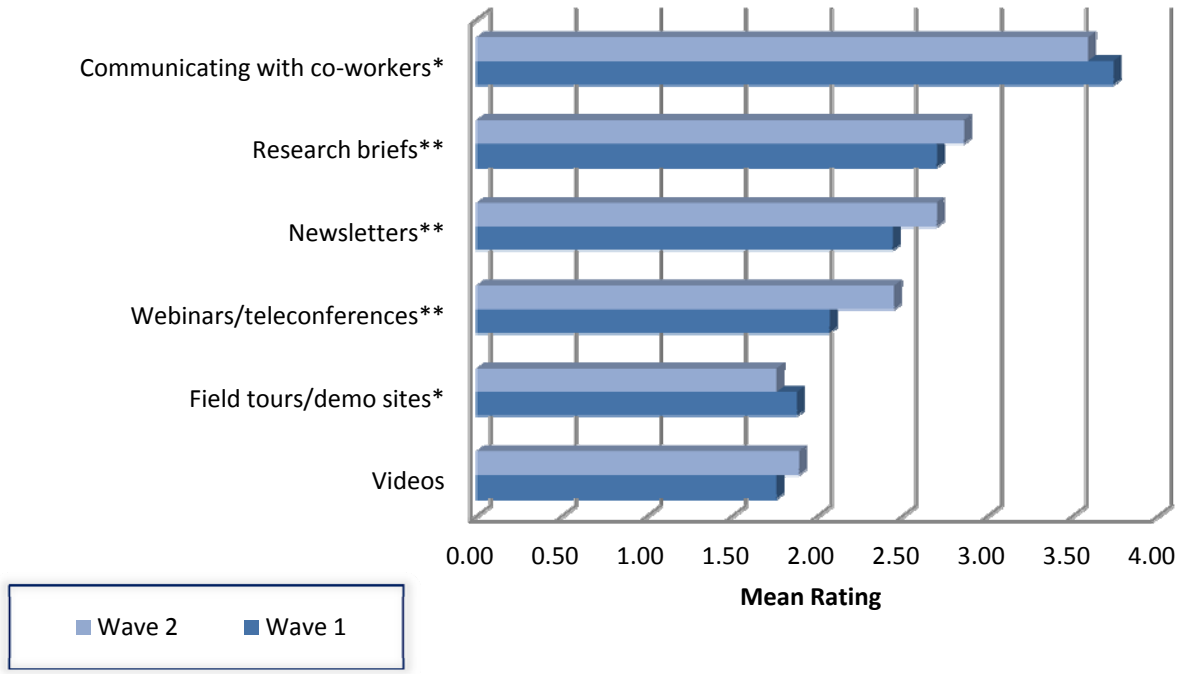
Experiences with Fire Science Information Communication Sources

Analyses revealed numerous significant differences in both the frequency with which Consumers accessed certain fire science information sources and their ratings of usefulness of the information obtained from these sources across survey Waves 1 and 2. Overall, these findings suggest that the consortia are not only increasing Consumer access to sources of fire science information, but also are increasing the relevance and/or applicability of the information provided (as indicated by higher Wave 2 ratings of "usefulness").

Significant mean differences in the frequency of Consumer access to specific sources of fire science information are depicted in Figure 14. The sources with the most notable increases in frequency of access are **1)** *Webinars/teleconferences* (W1 *M* = 2.07, *SD* = 1.09; W2 *M* = 2.45, *SD* = 1.19), *t* (971) = 5.57, *p* < .001 and **2)** *Newsletters* (W1 *M* = 2.44, *SD* = .99; W2 *M* = 2.70, *SD* = 1.02), *t* (799) = 3.77, *p* < .001. These findings reflect the efforts of several consortia aiming to increase the number and accessibility of webinars, as well as their efforts in disseminating newsletters and research briefs to help inform Consumers of current research findings and learning opportunities. There also were more minor but still significant increases in the frequency with which Consumers accessed fire science information via *research briefs*, (W1 *M* = 2.70, *SD* = .91; W2 *M* = 2.86, *SD* = .90), *t* (1,034) = 2.85, *p* < .001.

Frequency of accessing fire science information via *field tours/demonstration sites* and via *communicating with co-workers* slightly decreased from Wave 1 to Wave 2. There are no ready explanations for these small but significant changes. They may reflect experiences of different samples of Consumers across Waves 1 and 2, or may be statistical artifacts. Additional data from subsequent survey waves are needed to determine whether access to these sources is indeed decreasing at the aggregate level, or whether these differences are isolated incidents attributable to a variety of external factors.

Figure 14. Fire Science Information Communication Sources: Differences in Frequency of Access across Survey Waves



*p<.05 **p<.01

Figure 15 depicts significant differences in Consumers' mean ratings of the usefulness of fire science information obtained from specific sources. Increases in communication source access tended to correspond with increases in ratings of usefulness. The most substantial differences in usefulness ratings across Wave 1 and Wave 2 were for *webinars/teleconferences* (W1 *M* = 2.80, *SD* = 1.28; W2 *M* = 3.25, *SD* = 1.19), *t* (844) = 5.46, *p* < .001; followed by *newsletters* (W1 *M* = 2.80, *SD* = .98; W2 *M* = 3.09, *SD* = 1.02), *t* (997) = 4.45, *p* < .001; and *research briefs* (W1 *M* = 3.22, *SD* = .94; W2 *M* = 3.42, *SD* = .91), *t* (1,068) = 3.31, *p* < .001. Thus, initial comparisons not only reveal an increase in the accessibility of convenient sources of fire science information, but also suggest that the quality and relevance of information obtained via these sources has improved.

Obstacles to Accessing and Applying Fire Science Information

There were statistically significant differences in Consumers' perceptions of three of the five potential obstacles to accessing and applying fire science information as presented in Waves 1 and 2 of the online survey. First, Wave 2 respondents were significantly less likely to agree that *fire science information is not available in one convenient place* (M = 3.22, SD = .88) than were Wave 1 respondents (M = 3.43, SD = .82), t (1,212) = 4.39, $p < .001$. Second, Wave 2 respondents were significantly less likely to agree that *lack of communication **between** agencies and organizations in my region decreases the accessibility of fire science information* (M = 3.21; SD = .99) than were Wave 1 respondents (M = 3.38; SD = .96), t (1,211) = 2.88, $p < .01$. Finally, agreement that *lack of communication **within** agencies and organizations in my region* hindered the accessibility and applicability of fire science information decreased from Wave 1 (M = 3.26, SD = .95) to Wave 2 (M = 3.14, SD = 1.02), t (1,207) = 1.98, $p < .05$.

As with most of the significant findings emerging from this initial comparative analysis, these differences in Consumers' perceptions of obstacles are small in magnitude. This is expected considering that the eight original JFSP consortia have implemented programming relatively recently (i.e., during the past 1-2 years), and are in the beginning phases of program expansion and refinement. Yet, these findings reflect progress towards shared consortia goals. *Fire science information is not available in one convenient place* remained the top obstacle across Waves, but comparisons indicate that consortia efforts (such as establishing individual websites) are helping to address this critical obstacle. Results further suggest that consortia efforts may have helped improve both inter-agency and intra-agency communication, which should promote sharing of fire science information.

Producer Trends

As previously mentioned, Producer respondents were much more likely than Consumer respondents to identify with more than one consortium. Because of this increased identification "overlap" among Producers, it was not possible to conduct comparative analyses using Producer samples only identifying with an original JFSP consortium. Instead, Independent samples t-tests were conducted comparing the mean Wave 1 and Wave 2 responses of *all* Producers, regardless of consortia affiliation. We were unable to examine changes that could be specifically attributed to the efforts of the eight original consortia, but still felt that aggregate comparisons among Producers may be informative given the extent of cross-consortia involvement among these samples. Though Producers were more likely than Consumers to identify with both an original and newly-funded consortium, those with such cross-affiliations also may have had opportunities to observe and experience the effects of original consortia programming over the past one to two years.

Comparative analyses using the full samples of Wave 1 and Wave 2 Producers only revealed two significant differences in mean responses to all survey items. These small but unexpected differences were observed in the item set regarding "Producer Research Practices and Experiences with Fire Science Information Consumers." Wave 2 respondents were slightly (but

significantly) less inclined to agree that they *make an effort to present information to managers/practitioners in a way that is easy to understand* (M = 4.45, SD = .55) than were Wave 1 respondents (M = 4.57, SD = .62), t (372) = 2.10, $p < .05$. In addition, Producers were less likely to view themselves as *approachable to managers/practitioners* at Wave 2 (M = 4.21, SD = .64) than at Wave 1 (M = 4.36, SD = .62).

It should be noted that the Producer means for these items were quite high (indicating positive responses) for both Waves 1 and 2. At this point in the external aggregate evaluation, it is not possible to determine whether these results reflect actual changes in Producers' perceptions and behaviors. That is, they may be attributable to other factors such as different samples with different experiences and statistical artifacts. Again, data from future survey waves are needed to clarify the impact of consortia efforts on Producers' attitudes and behaviors.

Online Survey Component: Summary and Implications

The cooperation of the JFSP consortia is essential to all components of the external national evaluation. The online survey in particular requires significant consortia efforts with regard to identifying and compiling a participant sample, disseminating the survey requests, and follow-up with respondents and the evaluation team. Due to these consortia efforts, over 1,000 individuals participated in both Waves 1 and 2 of the online survey. These responses have helped establish a solid baseline for future assessment of consortia progress toward their shared goals in addition to illuminating consortia strengths and areas for improvement.

> *"For decades there has been a serious need for an interagency and interdisciplinary forum to share information…the Consortium is greatly helping to fill that need."*
>
> -Consumer Respondent

The current report focuses on describing the Wave 2 online responses in terms of basic frequencies and means. As six consortia were only recently funded, this survey wave is the first to assess the experiences and opinions of individuals representing all of the fourteen JFSP consortia. In general, Wave 2 survey results were similar to those obtained from Wave 1, which should be expected considering the varying stages of consortia development. Wave 2 results should still be viewed as a baseline assessment; however, some differences emerged when comparing the mean responses of participants *only affiliated with the original JFSP consortia* across survey waves. Minor differences in aggregate responses (including all respondents, regardless of consortia affiliation) were observed as well.

The primary themes (i.e., regarding consortia successes and challenges) derived from basic analyses of Wave 2 survey responses were largely consistent with those identified in the 2011 Evaluation Report. Respondents from all three target groups had relatively positive experiences with fire science information; they further indicated that their motivations, decisions, and behaviors often were influenced by what they had learned about fire science.

In general, Consumers' responses reflected the following key needs, which support the overarching objectives of the JFSP consortia: 1) The need for fire science information that is *easy to understand*; 2) The need for fire science information that is *easy to apply to their specific problems*; and 3) The need for fire science information that is *available in one convenient place*. Effective translation of fire science research to applied work continues to be an issue for some Consumers, as evidenced by the following comment:

> *"My biggest issue is translating research into applied on the ground work. While it is good to know what research is out there, it would also be nice to have some effective transfer to the field."*
>
> -Consumer Respondent

All consortia are currently developing, implementing, and executing a variety of outreach and educational activities designed to address these issues. Individual consortium websites are especially critical in facilitating access to comprehensible and practical fire science information. These websites feature user friendly research summaries and briefs, webinars, and workshop and field tour announcements. The decrease in agreement among Consumers from the original consortia that *fire science information is not available in one convenient place* may well be attributed to the establishment and ongoing refinement of consortia websites. Both Consumers and Producers who had visited their consortium's site had favorable perceptions of site user-friendliness, content, and organization; moreover, perceptions of consortia sites became more favorable from Wave 1 to Wave 2 among Consumers from original consortia. With six newly funded consortia working to establish their sites and the remaining eight working to modify and/or expand their sites, we expect further evidence of site impacts from future survey waves.

Specific site features will be discussed further in the "Webmetrics" section; however, current online survey findings have specific implications for interactive "sharing" site features. Such features can facilitate communication among fire science professionals in general and among Consumers and Producers in particular through discussion forums. The "Ask an Expert" feature, for example, allows Consumers to submit specific questions to Producers. Though several existing consortia sites include such features, the majority of Consumers and Producers surveyed were unaware of them. To help maximize the opportunities for communication and collaboration between these two groups, consortia may wish to focus on increasing awareness of such site features, perhaps through enhanced or strategic placement on individual sites or site notifications, as well as ensuring their proper functioning.

Both Consumers and Producers expressed a desire to work with one another on research projects, but this desire was higher among Produces than Consumers. In addition, Producers' self-ratings of approachability were higher than Consumers' ratings of the approachability of Producers. Though these differences may partially be due to Producers' motivations to present themselves as accessible to Consumers, they still indicate discrepancies between Consumer and Producer perceptions of one another.

> *"I want more contact with Land Managers to find out what their research priorities are."*
>
> -Producer Respondent

Efforts should be made to ensure that Consumers are aware of Producers' willingness to work with them and help target their applied problems. Similarly, Producers should try to "follow through" on such sentiments, perhaps via interactions with Consumers at in-person learning activities or interactive website features. Current results suggest that Producers are making significant efforts in providing relevant fire science research results and tools to Consumers, and that Producers should continue to focus on *presenting/publishing information for fire science managers/practitioners.*

Consumers' fire science information preferences shifted a bit from Wave 1 to Wave 2. At the aggregate level (including respondents affiliated with all 14 consortia), Wave 2 respondents preferred more conveniently and independently accessed sources of fire science information,

such as *communicating with co-workers, journal articles/papers/reports*, and *web-based* sources. These time-effective sources were the most frequently accessed and also were rated as the most useful sources of fire science information. Wave 1 respondents also preferred *communicating with co-workers*, but expressed stronger preferences for more interactive sources of fire science information (e.g., workshops, conferences) than did Wave 2 respondents. Both the busy schedules of fire managers/ practitioners and the establishment of individual consortia websites likely contributed to the increased preference for more individualized and time-effective communication sources. Several consortia have worked to provide additional webinars to the Consumer population and have archived past webinars on their websites. Not only did Consumers express appreciation for such efforts in open-ended survey comments, but both the frequency of access and usefulness ratings for webinars significantly increased from Wave 1 to Wave 2 (among original consortia respondents). Yet, "hands-on" interactive sources such as *workshops/trainings* continued to receive high usefulness ratings, though Consumers had limited opportunities to participate in these activities. Overall, findings strongly support consortia endeavors to provide convenient fire science information sources via their websites as well as to increase the availability of interactive learning opportunities.

As in Wave 1 of the survey, Wave 2 General Public respondents had positive perceptions of fire science information, and reported that their knowledge of fire science and fire management issues influenced their behaviors. They continued to express a strong interest in learning more about fire science/management related issues. Both Wave 1 and Wave 2 General Public samples were diverse in their roles. Most respondents were more invested in fire science and management issues that the "average" community member. Many currently or previously held jobs in environmental science fields, and some respondents had once worked as fire managers or scientists. Others were large private landowners or environmental advocates, though several "interested community members" also participated. Consortia targeting the "General Public" should consider such diversity in developing and implementing programming. The effectiveness of strategies to increase fire science information and application will likely vary among different sub-populations of the General Public.

> "*I find that information is not readily available to the general community. Where information is available, it is hard to understand. A simple and consistent message would help.*"
>
> -General Public Respondent

General Public respondents believed that *communicating with fire management/extension professionals* and the *internet* were the most useful sources of fire science information. Though opportunities to communicate with management/extension professionals were limited, most General Public respondents reported obtaining fire science information from the internet. Yet, General Public respondents also were largely neutral toward the statement that *fire science information is easy to find.* Fostering awareness of individual consortia websites and including content relevant to the sub-population targeted (e.g., typical community members,

landowners, those with fire science/management experience) should help improve fire science information access and application among the General Public.

> *"Information flows through neighborhoods and social networks. It does not matter how good the fire science information is if it does not get out to these networks."*
>
> -General Public Respondent

Ultimately, Wave 2 online survey findings strongly support the proposed and ongoing efforts of the JFSP consortia. Current results indicate that consortia outputs (e.g., research syntheses, websites, interactive learning activities that promote communication and collaboration among fire science professionals) are well-suited to addressing fire science information needs and obstacles to the successful dissemination and application of fire science research results and tools. Moreover, comparisons of Consumers' (affiliated with original consortia) mean responses across Wave 1 and Wave 2 yielded several statistically significant improvements regarding their perceptions of fire science information Producers, consortia impacts, individual consortia websites, and usefulness of information obtained from various fire science information sources. Again, six consortia were only recently established, and the remaining eight are still in the initial phases of program implementation and refinement. Thus, data from future survey waves are needed to provide a more thorough understanding of consortia progress and impacts at the aggregate level.

> *"I believe that the JFSP consortia are necessary for bridging the gaps between scientists, managers, and the general public. I'm 100% behind this process…LET'S GO!"*
>
> -Producer Respondent

Webmetrics Component

In their proposals to the JFSP Board, all consortia highlighted the importance of developing, implementing, and expanding their individual websites in enhancing fire science delivery. The consortia websites are a primary (perhaps *the* primary) means of increasing fire science information accessibility and applicability among Consumer, Producer, and General Public populations. These websites serve multiple purposes: They can provide "one-stop shopping" for users (frequently Consumers) who need to access a variety of practical fire science information in one convenient place; keep Producers informed of the most current research findings and provide a forum for sharing current research endeavors and results; engage the General Public in fire prevention and management issues; facilitate communication between Consumers, Producers, and the General Public through interactive features; and notify users of funding and learning opportunities.

The webmetrics component of the current evaluation includes both quantitative and qualitative assessments, initially developed and implemented by the evaluation team and subcontractors Sarah Trainor (Alaska) and Toddi Steelman (Southern Fire Exchange). The quantitative piece involves collection and analysis of common "web analytics" or indicators regarding website users and utilization. The qualitative piece focuses on the design and features of consortia websites, and aims to enhance the understanding of website function and operations.

Limited quantitative and qualitative webmetrics data were collected during late summer of 2011 and were presented in the 2011 Evaluation Report. The second wave of webmetrics data presented here still should be interpreted as a baseline assessment. Some of the original eight consortia only have recently launched their individual websites and embedded analytics packages in order to collect user data, while most of the six newly funded consortia are preparing to launch their sites in the upcoming months. Upon collecting more standardized and consistent future data, the evaluation team can conduct comparisons and trend analyses with the intent of: 1) Assessing basic impacts of consortia websites regarding the dissemination of fire science research results and tools; 2) Illuminating Best Practices and features of effective consortia websites; and 3) Addressing any challenges to the successful dissemination of current, practical, and synthesized information via consortia websites.

Quantitative Webmetrics Component

The evaluation team has requested that all JFSP consortia with established websites embed an appropriate analytics package (e.g., Google Analytics) to collect monthly data pertaining to individual website users and patterns of utilization. Consortia also were asked to report these monthly data to the evaluation team bi-annually through the use of an Excel template specifying the quantitative indicators of interest. The second wave of quantitative webmetrics data was submitted to the evaluation team during Spring 2011; all of the original eight consortia with established websites complied with this request.

As in the preliminary wave of webmetrics data collection, however, data fields are not yet complete for many of the responding consortia. This is due partly to some individual site issues and partly to some routine challenges in data collection such as missing data for a specific month and lack of uniformity in reporting data. Further, we were unable to include most of the data submitted by the Appalachian and Southwest consortia in aggregate analyses. Until recently, the Southwest website was nested within a larger site, so in most instances it was impossible to separate the data pertaining specifically to the Southwest site from that recorded by its host site. Because the Southwest consortium has recently launched an independent site, such nesting should not be an issue in further waves of data collection and analyses. The Appalachian consortium's site address closely resembles that of a popular overseas website; many visitors landing at the Appalachian's site had intended to visit the overseas site. Thus, most data submitted from the Appalachian consortium are significantly confounded. That is, the Appalachian consortium reported 20,000 plus monthly visits due to site address similarity, whereas all other consortia reported below 1,000 monthly visits. The Appalachian consortium is aware of this issue and in the process of addressing it.

A review of the Wave 2 quantitative webmetrics data highlighted some issues pertaining to the actual indicators requested and to the data collection template itself. The evaluation team is currently working with Alaska Coordinator Jennifer Northway to narrow the data collection fields and make the collection template as user-friendly as possible. In addition, the evaluation team will further efforts to ensure that the consortia PIs and Coordinators understand the procedures for collecting and reporting quantitative webmetrics data.

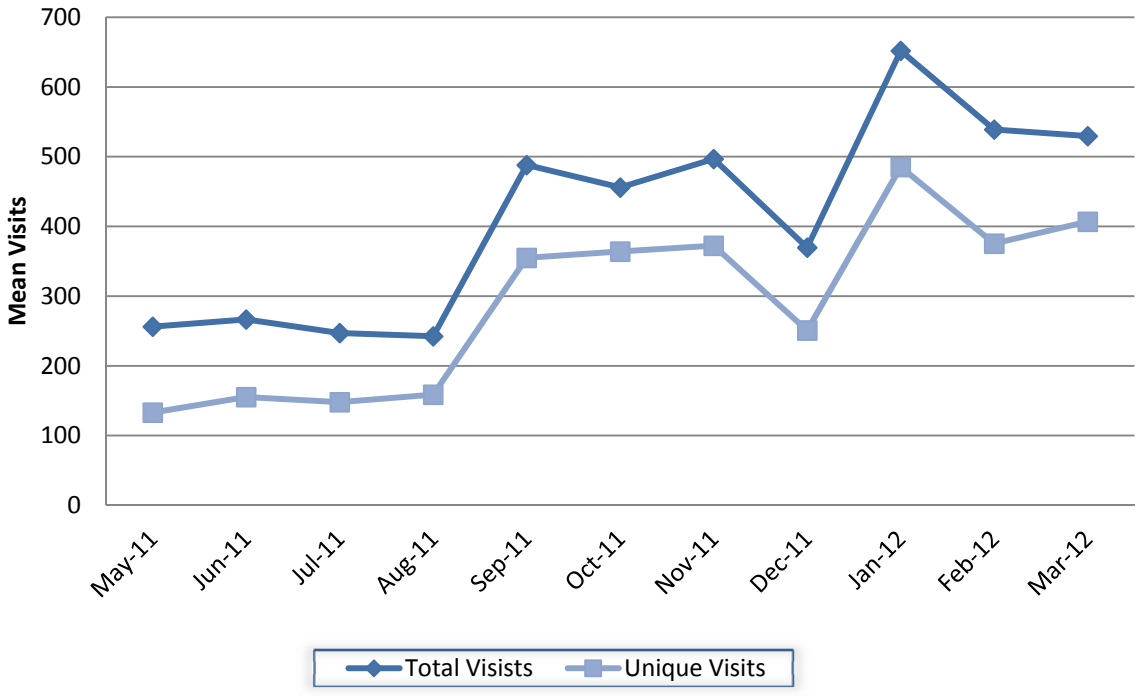
Launch dates for the original consortia websites ranged from April 2009 to August 2011, and the majority reported that they had embedded their analytics package during the spring of 2011. Findings presented below largely pertain to Wave 2 of webmetrics data collection, which included monthly data spanning from August 2011 to March 2012. When appropriate, limited findings from Wave 1 will be cited for comparative purposes. As with findings from the other national evaluation components, quantitative webmetrics results are presented at the aggregate level. Yet, the uniqueness of each consortium does have implications for website evaluation, which will be discussed further in the "Top Content" sub-section.

Basic Website User Data

All consortia with established sites were asked to report the number of "total" and "unique" visits to their websites between August 2011 and March 2012. Total number of visits provides a raw count of instances in which the website was accessed during a one-month period, whereas the number of "unique" visitors provides a count of *unduplicated* visitors to the website. To illustrate this point, an individual visiting a consortium website five times during a particular month would be counted only once as a "unique" visitor, but all five website visits would be counted under "total" number of visits. Total number of visits indicates the general frequency with which the websites are being accessed, whereas the number of "unique" visitors indicates the extent to which the consortia websites are recruiting new users.

The mean total and unique visits to original consortia websites from May 2011 to March 2012 are depicted in Figure 16. The number of reporting consortia included in these analyses ranged from **5** (data reported for May 2011) to **7** (for the remainder of the months, six consortia provided usable data for unique visitors, and seven provided usable data for total visits). Standard deviations of the mean of both total and unique visitors for each month were quite large, ranging from 100 to 300; this is expected considering consortia diversity in terms of site development and regional user needs. These initial data indicate that consortia sites are successfully attracting and retaining new users, as the overall mean number of total and unique visits is increasing with time. Notable decreases in total and unique visits during December and again at the beginning of spring are likely attributable to external seasonal factors, such as the holiday season and the advent of fire season, rather than to any particular aspects of consortia sites. Future waves of quantitative webmetrics data collection should help to illuminate seasonal patterns of site access.

Figure 16. Mean Total and Unique Site Visits per Month



Consortia also were asked to report monthly "bounce rates," which indicate the percentage of website visitors who did not further explore the website site upon accessing the home page. Higher bounce rates may indicate that website content and features are irrelevant to users or that the website design is confusing and difficult to navigate. As website layout and features differ among consortia, however, bounce rates may have varying implications. For instance, some Consumers may be searching for information located within their consortium's website

homepage and subsequently exit the site; such instances would not be indicative of user dissatisfaction or of websites' failure to deliver relevant fire science information.

Wave 1 quantitative webmetrics results, aggregated across the months of May 2011-July 2011, revealed a mean bounce rate of **54.06%** (*SD* = 19.17) for responding consortia (*n* = 4). The comprehensive mean bounce rate for Wave 2 (aggregated across the months of August 2011-March 2012) was similar with five participating consortia (*M* = 55.31%; *SD* = 7.94). There were no discernible trends in mean bounce rates from month to month, but all bounce rates for each reporting consortia were within the acceptable range.

Visitor Loyalty

Data also were collected to obtain a preliminary understanding of visitor loyalty to the consortia websites. The extent of visitor loyalty is determined by the number of times that the same user accessed a website over a specified time period. High visitor loyalty indicates that users are engaged and satisfied with website content; in essence, visitor loyalty is a measure of user retention.

Only three consortia reported complete monthly data regarding visitor loyalty for Wave 2 of data collection (see Table 16); however, the Wave 2 aggregate means for visitor loyalty reflect an additional consortium's data (this consortium only had aggregate visitor loyalty data available through August 2011-March 2011). There were no readily observable monthly trends in visitor loyalty pertaining to Wave 2 of data collection, except for the notable decrease in site visits during December which is likely attributable to the holiday season. Yet, results do indicate substantial increases in user loyalty across waves, suggesting that the sites are successfully retaining users and addressing their fire science information needs.

Table 16. Visitor Loyalty: Mean Frequency of Visits to Consortia Websites per User

	Frequency of Visits per User				
Month or Wave	**1**	**2**	**3 – 8**	**9 – 25**	**26+**
Wave 1 Aggregate Mean (*SD*)	**119.46** (64.77)	**25.29** (15.04)	**32.63** (13.27)	**28.92** (10.23)	**39.21** (12.52)
August 2011	108.33	21.67	32.67	20.67	39.33
September 2011	256.67	57.00	55.67	11.00	35.00
October 2011	285.00	37.73	57.00	18.33	46.33
November 2011	249.00	65.67	74.00	16.00	20.33
December 2011	134.67	24.33	38.67	22.00	19.00
January 2012	272.00	56.67	97.00	34.67	28.00
February 2012	133.01	28.02	46.89	34.33	26.67
March 2012	233.00	44.67	55.67	31.33	27.00
Wave 2 Aggregate Mean (*SD*)*	**272.44** (216.32)	**57.09** (45.68)	**76.91** (55.48)	**29.34** (19.81)	**45.97** (46.70)

Traffic Sources

In order to provide "one stop shopping" and ultimately enhance fire science delivery, it is imperative that potential users are able to easily locate and access the JFSP consortia websites. To better understand the means whereby users encountered their consortium's websites, data were collected regarding the top website traffic sources and use of specific keywords in searches resulting in consortium website visits.

"Traffic sources" refers to the specific web-based mechanisms that subsequently directed visitors to the consortia websites. For instance, individuals may use a search engine such as Google to locate consortium sites, or they may access their individual consortium website via a link posted on other fire science websites. Table 17 displays the breakdown of frequencies for four general traffic sources that resulted in consortia site visits. "Search" refers to search engines, indicating the percentage of users that landed at a consortium website by entering a related term using Google, Yahoo, Bing, etc. "Referrals" encompass all other websites and domains (including emails) with a link that ultimately directed the user to the particular consortia site. "Direct" refers to the percentage of users who accessed a consortia site by directly typing the site's address into their web browser (or accessed the site address via browser history). "Other/Campaigns" is a catch-all category which captures site arrivals from sources not otherwise specified (most commonly advertisements and mailchimp announcements). Wave 1 and August 2011 means include data provided by five consortia; all other means are based on data provided by six consortia.

Direct access continued to be the most common traffic source for Wave 2, but the percentage of users accessing the sites directly steadily decreased across months, with the exception of a very minor increase in March 2012. It is expected that most users will access the consortia sites directly, particularly if they are frequent users. Yet, a decrease in direct access is promising because it suggests that the sites are being effectively promoted through other means. For instance, the mean percentage of referrals increased from Wave 1 to Wave 2, as well as the percentage of users landing on sites via web searchers. No clear monthly pattern emerged for either of these indicators, however.

Table 17. Mean Percentage of Users Landing on Consortium sites via Traffic Source

	Traffic Source and % of Referrals			
Month or Wave	**Search**	**Referrals**	**Direct**	**Other/Camp.**
Wave 1 Aggregate Mean (*SD*)	**23.40** (8.30)	**23.83** (9.19)	**46.83** (17.15)	**6.77** (12.85)
August 2011	27.76	20.91	46.56	2.97
September 2011	29.18	22.12	46.69	2.42
October 2011	24.13	29.81	40.36	5.24
November 2011	23.31	31.50	40.00	11.00
December 2011	25.41	33.68	35.10	5.23
January 2012	19.99	35.72	34.18	10.21
February 2012	27.62	31.24	32.84	8.29
March 2012	27.52	28.88	33.62	8.66
Wave 2 Aggregate Mean (*SD*)	**25.62** (8.54)	**29.01** (12.78)	**38.66** (18.66)	**6.62** (12.07)

Consortia also were asked to indicate their top three *specific* traffic sources for each month. These data were entered as strings (i.e., web addresses, phrases), so no numeric analyses were conducted in this category. A basic review of these data illuminates the most common types of general traffic sources used to access the sites. For instance, those ultimately arriving at a consortium's site using searches overwhelmingly used the Google search engine. The majority of referrals originated from the JFSP home site (firescience.gov) and FRAMES, though cross-consortia links and University based links also generated web traffic. Finally, links embedded in mailchimp announcements, listserv emails, and blogs often appeared among the top three specific traffic sources.

These current findings regarding traffic sources indicate that consortia have made substantial and successful efforts to reach potential site users. The variety of traffic sources has significantly increased since Wave 1, with consortia actively recruiting new users via mailchimp, listservs, and consortia products such as newsletters. The popularity of Google as a referral source is promising, as this suggests that many potential users are quickly informed of their

consortium's site through this prominent search engine. The JFSP consortia should continue to explore electronic source opportunities to recruit users. This may include establishing linkages with other fire science and management-related sites or environmental science sites more generally as well as further exploration of search engine properties and key search terms. Consortia targeting the General Public may need to consider some additional means of reaching individuals who are not highly involved in the fire science/management community.

Top Website Content

One objective of the quantitative webmetrics component was to examine the popularity of site content. In doing so, we hoped to obtain an indirect measure of the degree to which specific site features and content were meeting users' needs. This information in turn could be used to inform further site development, modification, and expansion. We experienced several challenges, however, in reliably identifying top site content at the aggregate level.

Consortia were asked to report the number of monthly visits to each website page. This metric and the data collection instrument were designed with the expectation that data pertaining to specific site pages, features, and content could be reasonably aggregated across all reporting consortia. Though all sites do contain regionally-specific content, it was anticipated that most would include pages with shared themes, such as blogs, calendar/events, and literature libraries. Indeed, consortia sites provided similar features and regional information, however, aggregation and comparison of the popularity of specific pages across consortia proved difficult for several reasons. First, the configuration of site content and pages varied widely across consortia. For example, some included a comprehensive "Events" page listing all upcoming activities, whereas others included separate pages for each event. Such design components impact uniformly consistent data reporting. While one consortium may report the comprehensive number of visits to a page containing links to all research syntheses, another may report the number of visits to each specific synthesis. Second, the actual content of shared pages and features differed across sites. Newsletters and events pages contained different types of information beyond that which was regionally-specific. For instance, some calendars were routinely updated whereas others were mostly blank. Third, the varying designs of the sites must be considered in assessing page/content popularity. Certain pages may attract a large number of visitors due to their placement within the site, whereas other pages including potentially relevant information may be less frequently accessed because they are more obscured within the site.

Despite these issues, we were able to identify some general themes related to the popularity of specific content across the sites of **five** reporting JFSP consortia. User access of **archived distance learning opportunities** such as webinars, workshop summaries, and other types of presentations was very high across all reporting consortia. Pages specifically devoted to registration for **upcoming learning opportunities** such as workshops and webinars also were popular. The popularity of **"events"** pages varied across consortia, which is likely attributable to the actual content of these pages. Some consortia had more comprehensive "events" pages

listing all upcoming learning and funding opportunities, whereas others had unique pages for different opportunities.

Blogs and newsletters were relatively popular with site users across consortia, though the content of these features varied regionally. **Research syntheses** also received many user "hits." User access of these features did vary across consortia, however. A cursory review of the reporting consortia websites suggests that site configuration rather than the content of such pages may be responsible for the lower popularity of newsletters and research briefs in some sites. Specifically, consortia providing highly visible links to research briefs and newsletters on their home page reported more "hits" on these components than did consortia that required further user exploration or "searching" to access such components.

Interestingly, more comprehensive **searchable databases/literature libraries** did not attract users as expected. Such features were expected to be a primary strength of consortia websites in providing one-stop-shopping to fire science professionals. Although each reporting consortium offered somewhat different forms of searchable databases/libraries, user access was relatively low across consortia. There are many potential explanations for this finding. Perhaps some users were unaware of this feature or unsure about what kinds of information could be accessed via searchable databases. Many other users may not have been looking for specific fire science information during their visits, or found the information they needed in other site features such as research briefs, syntheses, or archived webinars. Some prior evaluations of large educational websites have found that users often prefer to browse the site rather than using a specific search feature.

Further quantitative webmetrics data as well as data collected from the site users themselves are needed to better understand the reasons underlying the popularity (or lack thereof) of specific site features.

> The data obtained to date suggest that consortia should work to ensure that site visitors are aware of key features and that they are functional and user-friendly. In addition, consortia may wish to review the organization of their sites to determine if any modifications may increase the visibility and accessibility of certain features.

Qualitative Webmetrics Component

The qualitative webmetrics component focuses on describing the consortia websites in an effort to enhance the understanding of their operation, organization, design, and content. At this phase in the evaluation, such information can be used to help determine whether website features support consortia objectives and target audience needs. Similarly, qualitative findings may help consortia with websites in varying developmental stages to identify areas for

potential improvement and to focus their efforts on including or expanding site elements most conducive to goal progress.

The qualitative component also is intended to compliment the quantitative webmetrics component. As web analytics data collection and reporting becomes more consistent across consortia during the coming months, relationships between quantitative and qualitative findings may emerge to help consortia discover Best Practices for website design and information delivery. Such analyses will be conducted in 2013 after sufficient time has elapsed to establish trends in website utilization and visitor behavior regarding the eight original JFSP consortia sites. We also plan to include webmetrics data from the six newly funded consortia in these analyses.

Qualitative data regarding consortia websites are collected annually using an online survey completed by consortia PIs and Coordinators, webmasters, or other key consortia personnel familiar with their consortium's website. Preliminary qualitative data pertaining to the original eight JFSP consortia websites are presented in the 2011 Evaluation Report. This year, representatives from all fourteen consortia were asked to participate in the qualitative webmetrics survey. Though the findings presented below focus on existing consortia sites, newly funded consortia without established sites were asked to report on their plans and expectations rather than on current site operations and content.

Website Maintenance and Operation

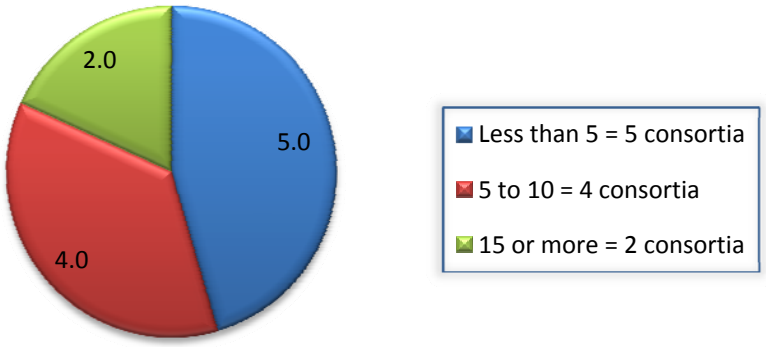
Consortia representatives responded to a series of questions regarding the operation and maintenance of their websites. The first survey item in this section asked respondents if their consortium had officially launched their website. **Eleven** of the fourteen JFSP consortia representatives indicated that they had launched their sites, though the three newly funded consortia in this group had either just very recently launched their sites, had not "announced" or advertised their developing sites to a broad audience, or both. All of the established consortia sites are in varying stages of development, with three in operation since 2010 or earlier and the remaining sites being launched between April 2011 and August 2012. Those who had not launched their sites planned to do so either during Fall 2012 or at the beginning of 2013.

Most of the eleven established sites were grounded in self-designed platforms (*n* = 5), followed by Squarespace (*n* = 4) and FRAMES (*n* =2). All Squarespace and FRAMES users reported that their current platform "mostly" or "completely" met their web design and analysis needs. Assessment of self-designed platforms was more variable, with some consortia reporting that they "completely" or "mostly" met their needs and others reporting that their current self-designed platforms were inadequate. This suggests that self-designed platforms can be highly effective (perhaps more so than existing platforms), but that their effectiveness is contingent upon a variety of factors such as platform design and the resources available to develop, maintain, and expand the platform. The three consortia without established sites had plans to use university-based or self-designed platforms.

Respondents indicated that the responsibility for site maintenance was largely delegated to the Consortia Coordinators. Coordinators were entirely responsible for **three** of the established consortia sites, and maintained **five** of the other established sites with some assistance either from the PI or other key consortia personnel. **One** recently established site was designed primarily by the consortia PI, for example, and another was maintained by a volunteer intern. Only **one** consortium employed a full-time webmaster. The three consortia with sites under construction planned to share responsibility for their sites among the Coordinator and other key personnel.

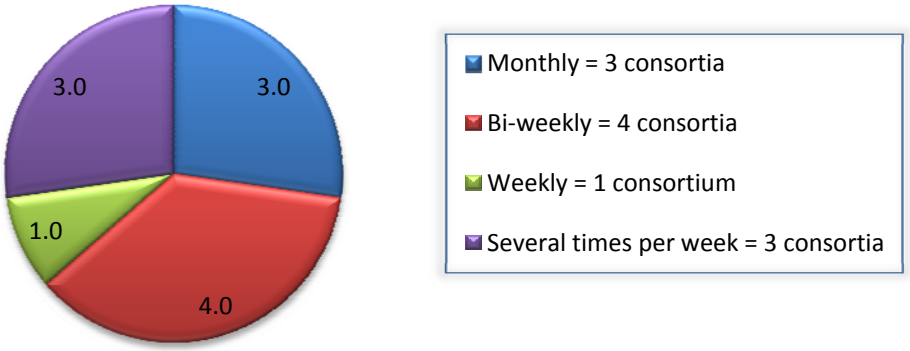
The amount of time spent on website maintenance varied across the 11 consortia with established sites (see Figure 17). Most reported spending an average of less than 10 hours per week on site maintenance, with **five** consortia spending less than 5 hours weekly and an additional **four** consortia spending 5 to 10 hours. The remaining **two** consortia representatives reported spending an average of 15 hours or more per week to maintain their website.

Figure 17. Average Number of Hours Spent per Week on Website Maintenance as Reported by JFSP Consortia



The frequency with which consortia sites were updated varied as well (see Figure 18). **Four** respondents reported that their consortium's site was updated on a bi-weekly basis, **three** said that their consortium's site was updated several times each week, and another **three** reported that updates occurred approximately once per month. The remaining consortium representative reported that their site was updated about once per week. Not surprisingly, consortia spending more time maintaining their sites also tended to report more frequent information updates.

Figure 18. Frequency of Website Updates as Reported by JFSP Consortia



Website Purpose, Target Audience, and Features

Despite regional differences, representatives from all JFSP consortia agreed that their current or developing sites aim to serve the following purposes:

- To provide online "one-stop shopping" whereby users can access a wide variety of information regarding fire science research results, tools, and learning opportunities
- To increase the dissemination and application of the most current fire science research findings
- To provide users with region-specific fire science information that is most relevant to their local problems
- To increase awareness of and participation in continuing learning opportunities and consortia programming
- To facilitate communication/collaboration among fire science professionals (e.g. managers, scientists)

All respondents from the eleven consortia with existing sites identified **fire managers/practitioners** or "Consumers" as the *primary* target audience for their website. When asked to identify any other target audiences, these respondents most commonly identified **fire researchers/scientists** or "Producers" (*n* = 11). The remaining target audiences included **stakeholders/decision makers** (*n* = 9), **private landowners** (*n* = 7) and **general community members/homeowners** (n = 4). Target audiences for the planned consortia sites were similar, though one newly-funded consortium identified **private landowners,** rather than managers/practitioners, as their primary target audience.

Consortia representatives with existing websites were provided a series of potential site features and asked to indicate whether their consortium's site included each feature; their responses are depicted in Table 18. The majority of extant consortia sites included a variety of features consistent with their site's purpose and target audience. For instance, most included events pages/calendars, a variety of fire science research briefs/fact sheets, information about learning opportunities such as workshops and webinars, and searchable fire science information databases. Interactive features such as a "help desk/ask an expert" component and discussion forums were not as common, though most (*n* = 7) of the responding consortia with existing sites had incorporated at least one of these interactive features. It should be noted that the number of established sites with links to social media, such as Twitter and Facebook, tripled this year (Wave 1, *n* = 3; Wave 2, *n* = 9). This expands the opportunities to connect target audiences with their consortium, and continually informs users about the most current consortia activities and regional issues when routine site updates are not possible.

The three consortia representatives who plan to launch their sites in the near future anticipated including most of the features appearing in Table 18; however, they were either "unsure" of plans to incorporate an "ask an expert/help desk" feature or had decided not to do so.

Though such interactive features have not been as successful as anticipated, their low popularity may be partially attributable to lack of user awareness and operational challenges. Consortia focused on fostering communication and collaboration among fire science professionals should continue to consider adding or enhancing interactive site features.

Table 18. Current Features of Consortia Websites

Website Features	Number of Consortia Including Feature
"About" section providing basic information about the consortium	**11**
A list of and/or links to key consortia contacts	**11**
Information or announcements about workshops	**11**
Calendar and/or information about upcoming events	**10**
Summaries of fire science information (e.g., fact sheets, summaries of workshops and/or other educational activities, lists of publications)	**10**
Downloadable newsletter	**9**
Information or announcements about podcasts/webinars	**9**
Links to social media (e.g., to Facebook, Twitter, YouTube)	**9**
External links to searchable fire science databases	**8**
External links to region-specific fire science resources	**8**
"What's new" section	**7**
Literature libraries	**6**
Information/reports on fire science in the news	**6**
Information or announcements about funding opportunities	**5**
Help desk/ask and expert component (allowing users to submit questions for researchers/scientists)	**5**
Blog	**5**
Interactive map	**4**
Information or announcements about online courses	**3**
Communication forum	**3**

Consortia representatives with established sites were further asked to identify the two site features they believed were most critical to helping their consortium attain its goals. Such identification was relatively consistent across consortia. Events/calendar pages, archived webinars, and publication libraries were the most frequently cited critical features. Respondents' reasons for selecting such features were well-supported, such as "these elements help engage users/increase consortium involvement, provide a variety of fire science information in one place, and have been the subject of positive feedback from users." Overall, the current online survey and quantitative webmetrics data support consortia representatives' perceptions of critical site features.

Website Evaluation Plans

The current national evaluation examines JFSP consortia processes and impacts at the aggregate level. Each consortium, however, is responsible for evaluating their programming

impacts at the regional level.[6] Consortia evaluations of their individual websites may provide valuable information that cannot be captured at the aggregate level. For instance, such findings can help "fill in the gaps" of the aggregate quantitative assessment by illuminating the reasons underlying the high or low popularity of specific pages and features. They can enhance the understanding of user needs, as well as website strengths and areas for improvement with respect to organization and content. Consortia wishing to evaluate their sites may do so through several different means, such as conducting focus groups, interviewing current and potential site users, and/or including a brief "pop-up" evaluation survey in their actual site.

Representatives from **three** of the eleven consortia with established sites reported that their consortium had conducted a regional-scale evaluation of their website. These evaluations consisted of informal interviews with site users; one consortium also administered a web-based survey regarding their site. General findings from these regional evaluations highlighted the need to continuously evaluate and update sites in order to meet audience needs. Evaluation findings from one consortium also illuminated some specific user needs and requests, which included links to archived webinars and searchable databases of region-specific publications.

Half (50%; *n* = 4) of the remaining consortia representatives who had not yet conducted site evaluations reported plans to do so in the future. Descriptions of such plans were largely general, which is understandable considering the varying developmental stages of established consortia sites.

Some consortia may hesitate to conduct evaluations of sites that have only very recently been launched. Yet, findings from regional-scale evaluations of consortium sites in their early phases could help inform continuing site development and identify user needs and site issues soon rather than later. Thus, it is recommended that all JFSP consortia develop and implement regional-scale website evaluations for established websites, regardless their developmental phase.

Challenges

Representatives from the eleven consortia with established websites were asked to *briefly* describe the greatest website-related challenge their consortium had experienced thus far. The overarching theme that emerged in this commentary was lack of time and/or resources to develop, maintain, or improve the websites. Newly-funded consortia representatives described challenges related to general site establishment, including digesting and selecting among the many options for site design while satisfying varying expectations for the site, and developing and maintaining specific site features, such as incorporating a regionally-relevant literature

[6] The JFSP Consortia Evaluation Resource Guide (2011) provides tools and references to assist consortia in evaluating their regional educational and outreach activities. To request a copy of this guide, please email Lorie Sicafuse at lsicafuse@unr.edu.

database. Consortia representatives with sites that have been established for several months or even years most commonly cited updating the site as their biggest challenge, followed by challenges related to enhancing site organization and design. Several representatives mentioned the burdens on the consortium coordinator related to site development, maintenance, and expansion.

Webmetrics Component: Future Directions

Results from this second wave of webmetrics data collection should still be primarily considered as a baseline assessment. All original JFSP consortia participated in Wave 2 of data collection, but there were several issues with missing data fields, and two reporting consortia were excluded from most analyses because their data were confounded with those from other sites. None of the six newly funded consortia were represented in this year's quantitative results, as they had not yet established websites at the time of data collection. We also experienced some challenges in aggregating and interpreting data pertaining to page views and top site content.

Despite these issues, the current results provide an initial understanding of the extant consortia sites and may help inform future site development, expansion, and modification. Consortia have made significant efforts to reach their target audiences by advertising their sites, and are maintaining site features consistent with their objective of providing a wide variety of fire science resources in one convenient place. Current findings indicate that these efforts have been successful, as consortia are increasingly attracting and retaining site users. Certain site features, such as archived webinars, appear particularly relevant for Consumer audiences. Regional-scale evaluations can provide a more thorough understanding of individual consortia sites that cannot be achieved at the aggregate level.

Qualitative findings highlight some of the challenges that consortia face in maintaining and enhancing their sites. Most notably, several respondents experienced challenges that were ultimately related to a lack of time and resources (e.g., keeping sites continually updated and "fresh," improving site configuration/organization, compiling relevant site material). In many cases, Coordinators are tasked with maintaining their consortium's site in addition to their other responsibilities; only one consortium employs a full-time webmaster. Considering funding constraints, it may be difficult to immediately resolve issues related to lack of time, personnel, and other resources. Yet, these challenges should be acknowledged and addressed to the extent possible.

The external evaluation team is currently working to enhance the validity and consistency of webmetrics data reported in future waves. This includes revising the quantitative data collection template to help minimize the reporting burden on consortia and to maximize the usefulness of the data requested for evaluation purposes. In addition, the evaluation team will ensure that both original and newly-funded consortia understand the expectations and procedures regarding webmetrics data collection and reporting. These efforts, coupled with the participation of the six newly-funded consortia in webmetrics data collection, should help build a solid foundation for assessing the progress and impacts of consortia sites and illuminating Best Practices.

Appendix A: Timeline of National JFSP Consortia Evaluation Activities

Season/Year	Completed or Scheduled National Evaluation Activity
Fall 2010	• Draft online survey in collaboration with consortia PIs and coordinators • Revise and finalize online survey based on consortia feedback
Winter 2011	• Submit protocol for online survey to the University of Nevada, Reno (UNR), Institutional Review Board (IRB) • Obtain IRB approval to conduct online survey • Develop initial draft of Evaluation Resource Guide and request feedback from consortia PIs and other key JFSP personnel.
Spring 2011	• Launch first wave of online survey in conjunction with the eight original JFSP consortia • Develop quantitative and qualitative webmetrics evaluation components with subcontractors Sarah Trainor and Toddi Steelman
Summer 2011	• Collect quantitative and qualitative webmetrics data for Wave 1 of the national evaluation • Revise Evaluation Resource Guide based on reviewers' feedback
Fall 2011	• Finalize and distribute JFSP Consortia Evaluation Resource Guide • Finalize and distribute JFSP Consortia 2011 Evaluation Report
Winter 2012	• Submit protocol detailing online survey changes to the UNR IRB (incorporating six newly-funded consortia and additional consortium-specific items) • Obtain IRB approval to conduct modified online survey
Spring 2012	• Launch Wave 2 of online survey in conjunction with all six newly-funded consortia and six of the original consortia • Collect quantitative webmetrics data for Wave 2 of the national evaluation
Summer 2012	• Collect qualitative webmetrics data for Wave 2 of the national evaluation • Develop Qualitative Interview component of national evaluation • Submit protocol for Qualitative Interview component to IRB

Appendix A continued

Season/Year	Completed or Scheduled National Evaluation Activity
Fall 2012	• Obtain UNR IRB approval to conduct Qualitative Interviews • Finalize and distribute JFSP Consortia 2012 Evaluation Report • Modify quantitative webmetrics collection template • Solicit and review requests to add consortium-specific online survey items
Winter 2013	• Submit revised online survey protocol to UNR IRB (detailing survey changes and addition of consortium-specific items) • Obtain IRB approval to launch modified survey • Collect first round of quantitative webmetrics data for Wave 3 of the national evaluation • Launch Qualitative Interview Component
Spring 2013	• Launch Wave 3 of online survey in conjunction with all participating JFSP consortia • Finish collecting, transcribing, and analyzing Qualitative Interview data
Summer 2013	• Collect second round of quantitative webmetrics data for Wave 3 of the national evaluation • Collect qualitative webmetrics data for Wave 3 of the national evaluation
Fall 2013	• Finalize and distribute JFSP Consortia 2013 Evaluation Report, which will include Qualitative Interview results • Solicit and review requests to add consortium-specific online survey items
Winter 2014	• Seek and obtain UNR IRB approval to launch modified online survey • Collect first round of quantitative webmetrics data for Wave 4 of the national evaluation
Spring 2014	• Launch Wave 4 of online survey in conjunction with all participating JFSP consortia
Summer 2014	• Collect qualitative webmetrics data for Wave 4 of the national evaluation • Collect second round of quantitative webmetrics data for Wave 4 of the national evaluation
Fall 2014	• Finalize and distribute JFSP Consortia 2014 Evaluation Report