JFSP Project Number: 09-S-04-9
Project Title: The Southern Fire Exchange: Putting Fire Science on the Ground
Principal Investigator and Affiliation: Leda Kobziar, University of Florida
Consortium Coordinator and Affiliation: Alan Long, Tall Timbers Research Station

I. Key Accomplishments, Challenges, and Lessons Learned

Throughout the last two years, the Southern Fire Exchange (SFE) has continued to build on the strong foundation of activities that we began implementing in 2010 to unite fire science and natural resource management in the Southeastern US. By focusing on interactive learning opportunities, such as field tours and workshops, we also made strides toward helping fire managers incorporate science into their decision making and management activities. SFE activities have been evaluated using several tools, including participant questionnaires after SFE events; discussion and feedback with Advisory Board (AB) members, the Southern Group of State Foresters (SGSF) Fire Chiefs, and other key leaders; the national online survey; and webmetric data from the SFE website. The following summary brings together evaluation results from FY2013 to January 2015 to provide an overview of our activities, progress toward meeting outcomes, and challenges and lessons learned along the way.

Increasing Awareness and Access to Fire Science

Continuing our success in reaching fire managers through Prescribed Fire Councils (PFC), the SFE shared updates and research highlights at 17 PFC meetings in 5 states, reaching over 2,600 people involved in fire management, education, and research. We also collaborated with existing and new partners to organize or present at 16 field tours and workshops with almost 500 attendees, and hosted 22 webinars with 1,100 live participants and 2,000 archived views. PFC meetings and field tour events are key venues for increasing our email list, which now has over 1,150 fire managers, scientists, landowners, community members, and students—an increase of 80% since the beginning of FY2013. Most email list members are located in the states where we have conducted the most presentations (Florida, North Carolina, Georgia, Alabama, and South Carolina). Four of those five states also represent a majority of the prescribed burning in the South. Through the SFE email list, we distributed 12 bimonthly "Fire Lines" newsletters, 9 timely email updates (a new activity for FY14), and notifications about new resources, webinars, and other events. All SFE activities are also promoted through our social media program, which has grown over the past two years and now includes more than 1,130 followers on Twitter, 850 likes on Facebook, and 40 followers on LinkedIn. The SFE website received 6,396 visitors in 2014, up from 6,283 in 2013—with 2,260 unique users viewing at least one of the 21 new fact sheets, 10-minute interviews, or other publications produced during this time period. Results from the national online survey confirm that more fire managers are aware of SFE and accessing information through our website[1]. Awareness of the SFE significantly increased for both managers and scientists from Year 2 (74%, n=165) to Year 4 (78%, n=78, $p<0.05$). Similarly, website use among respondents increased significantly from Year 2 (61%, n=160) to Year 4 (73%, n=77, $p<0.05$). National survey results also show significant increases in managers' frequency of accessing newsletters and webinars and in their perceptions of the usefulness of these communication methods in general. When asked specifically about SFE programs, national survey respondents rated the SFE website, newsletter, fact sheets, and webinars as the most useful products and activities (Figure 1). In addition, results show a significant increase in managers' level of agreement that the SFE is improving fire science accessibility and a

[1] For national online results, Year 2 refers to April 2011-2012 and Year 4 refers to April 2013-2014.

significant decrease in the obstacle "Fire science information is not available in one convenient place" (Table 1). One national survey respondent provided this insight:

- "They are very good at finding information on a wide variety of fire-related topics from a broad cross-section of sources and providing that information in a variety of formats. They regularly let their audience know about the availability of new information and fire-related activities, and are very good at allowing access to this new and all past information on their user-friendly website. They are a valuable asset for anyone involved or interested in fire ecology and management."

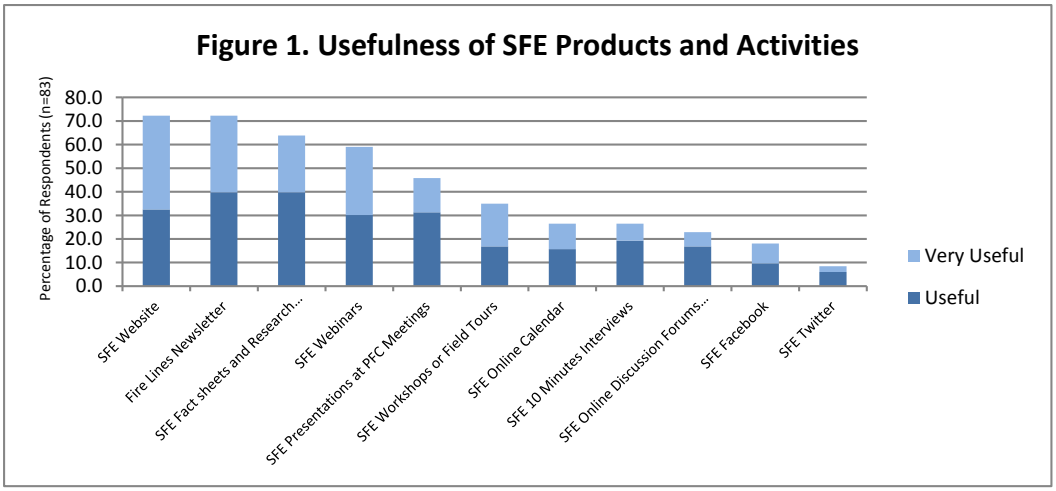

Table 1. Managers' Level of Agreement Regarding Fire Science Accessibility *(where 1 = strongly disagree; 5 = strongly agree)*	YEAR 2			YEAR 4		
	Mean	SD	n	Mean	SD	n
The Consortium has helped improve the accessibility of fire science information.**	3.67	0.76	96	4.17	0.70	53
Fire science information is not available in one convenient place.**	3.18	0.79	138	2.79	0.88	67

**significant at p<0.05

Increasing Understanding and Application

Results from surveys conducted after SFE events show that the majority of respondents increased their understanding of fire science topics "some" or "very much" (Table 2). The average percent of respondents reporting that their understanding increased "very much" was largest for field tour participants. Similarly, the majority of survey respondents reported being "likely" or "very likely" to use the information they learned in future management activities. Those stakeholders responding after a field tour indicated an even stronger level of likelihood than those who responded after a PFC presentation (Table 3) and some also provided specific ideas about how they would incorporate the provided information into their fire-related activities:

- "I work mainly with private landowners. The information and examples I gained today will be used to encourage landowners to restore native ecosystems."
- "I will take back the need for more monitoring pre- and post-burn."
- "I will use the information to review fire return intervals on the properties I manage."

Results from the national online survey show a significant increase in managers' level of agreement with the statement "The Consortium has helped improve the use and application of fire science information

in my region" from Year 2 (mean 3.49, n=96) to Year 4 (mean 3.94, n=53). In addition, national survey respondents provided examples of how they have used information learned through SFE events:

- "SFE resources have been useful to communicate between specialist or interest groups. It has helped facilitate the discussion with partners and groups who may differ in their understanding of fire and the role it plays in the ecosystem."
- "I attended a field day near Columbus, GA where the fire practitioner mentioned using a backpack blower to make a fire break to avoid destroying native groundcover. I bought a high power blower and used this technique on my land in an area with wiregrass and gopher tortoise populations. Great idea."
- "Applying prescribed fire to newly planted longleaf stands. Firing techniques and parameters such as relative humidity and drought conditions."

Table 2. Average Percentage of Participants that Increased Their Understanding of the Topic Some or Very Much

Event	Some	Very Much	n
Webinars	47%	37%	158
PFC Presentations	44%	41%	358
Field Tours	35%	51%	66

Table 3. Average Percentage of Participants Likely or Very Likely to Use Information Learned in Future Fire Management Activities

Event	Likely	Very Likely	n
PFC Presentations	48%	34%	369
Field Tours	36%	46%	65

Meeting Fire Science Needs

Almost all webinar participants (97%) reported being "somewhat satisfied" or "satisfied" with the webinar presentation, and all respondents reported being "likely" or "very likely" to participate in another SFE webinar. In addition, the majority (82%) of respondents at PFC meetings reported that the SFE presentation met their fire science needs "some" or "very much." From Year 2 to Year 4 of the national online survey, respondents felt a significantly higher level of agreement that the SFE is needed in the region (Table 4). In addition, respondents agree that they would recommend involvement in the consortium to co-workers.

Almost all SFE evaluations include an open-ended question where respondents suggest topics, issues, or questions to be addressed by future fire science research and delivery efforts. Over the years, topics related to smoke management continue to be mentioned across the region. In addition, prescribed fire planning and implementation and fire effects on plant and animal species have been frequently mentioned, along with many others. These topic lists have been categorized and prioritized by our AB, and used to guide program and logic model development.

Table 4. Managers' Level of Agreement Regarding Consortium *(where 1 = strongly disagree; 5 = strongly agree)*	YEAR 2			YEAR 4		
	Mean	SD	n	Mean	SD	n
The Consortium is needed to help coordinate sharing of fire science information in my region.**	3.81	0.83	138	4.19	0.56	53
I would recommend Consortium involvement to my co-workers.	3.84	0.78	95	4.08	0.78	53

**significant at p<0.05

Successes

As we reviewed SFE programs since inception, and especially over the last two years, our major successes stem from the continual evolution and refinement of the broad list of activities that we initiated in 2010. Key startup activities included establishment of our website, initiation of a regular

newsletter, fact sheets that emphasized existing science-based technology and resources, and presentations in a variety of venues to expose fire and natural resource managers to SFE and to begin a process of updating them on new research information and applications. Over the last two years each of these key programmatic components were maintained and enhanced, while we successfully added or expanded newer program elements, such as field tours, workshops, and webinars. Many of these events were initiated by SFE, but for several events we took advantage of our increased collaboration with other organizations, especially NGOs and conference organizers. We look forward to further expansion of this type of collaboration to cooperatively and cost-effectively open doors for science exposure and application. We played a leadership role in organizing training opportunities (RX310 course and field trips) at an IAWF international conference held in Raleigh. We will have at least two opportunities in the next three years, to offer similar activities for fire managers in the South at Association for Fire Ecology (AFE) Conferences in San Antonio and central Florida. One very recent success was our involvement with researchers during the last research proposal submission to JFSP. We worked closely with Principal Investigators for nine submissions and look forward to collaborating on science delivery products and activities with those that are funded. Finally, a success that we are extremely proud of is the close team effort that we have shared since the initial proposal. We have regular team conference calls, agree to discuss issues until we have consensus, and work hard to share in responsibilities.

Challenges and Lessons Learned

Despite the many SFE accomplishments over the last two years, several long-term challenges remain. The lessons learned from them play a key role in our plans for the next three years.

While the geographic challenge of equal programming in states from Virginia to Texas has been somewhat mitigated by increased webinar presentations (for example we had individuals from 26 states registered for our December 2014 webinar), direct face-to-face activities still need to be increased, especially in the western states in our region. Fortunately, the Oak Woodlands and Great Plains Exchange programs meet the needs of many fire managers in those states although their focus is not necessarily on pine ecosystems. Closely related, our hope that AB members would be active in promoting and aiding SFE activities in those peripheral regions has not substantially materialized. An important lesson learned that will guide us in the future is to carefully recruit a smaller, but still widely representative AB with members who are willing and able to help organize and even lead program activities in their individual states. At the same time, we need to develop more effective ways to conduct learning and field activities without being physically present at all activities. To accomplish this we plan to develop science presentations (besides webinars) that can be delivered online, as recordings at various meetings, or presented by AB members and representatives from our partner organizations.

A third challenge has been developing collaborative relationships with federal agencies that would lead to an SFE role in the region-wide training activities in which they cover new science and tools that impact their management endeavors and planning. Although we have had excellent collaboration with individual national forests and federal fire and weather specialists for specific activities and products, we still look forward to a broader role in assisting the agencies with their continuing efforts to incorporate science in planning. On a positive note, a periodic ongoing discussion with federal training leaders and the new USFS Region 8 Fire Director may be opening channels for SFE assistance.

A fourth challenge was evident when SFE began. Much of the large southern fire community has ample experience-based knowledge, derived from successes, near-misses, and even errors in fire management, yet the community has only a limited grasp of existing science-based information and tools. Our evaluations indicate significant progress in increasing their exposure through the website, written

products and PFC and other meetings, but we know more improvement is possible. A number of factors external to SFE may influence this challenge to some degree, e.g., policies and budget limitations on travel and continuing education opportunities, applicability of existing fire behavior tools and models to southern ecosystems (some question this), and predispositions and notions of people relative to science and the usefulness of its application. We believe that *demonstrations* of how fire science can improve management are critical for overcoming this bias, and include management applications in all of our webinars, presentations, and field tours/workshops. This is yet another reason why the SFE is committed to working with agencies to incorporate new fire science into applied training programs, and why our Leadership Team members volunteer to help teach agency (NWCG) courses where SFE products are disseminated and access to pertinent science information sources is demonstrated (e.g. our website, others).

Our creation and hosting of an online forum for fire community sharing and learning has presented another challenge. In response to initial requests from our stakeholders, we built the website capacity to host the forum, but its usage by the fire community has been far less than our original expectations. We look forward to seeing if utilizing LinkedIn as suggested on the new Squarespace website platform will expand online conversations. Similarly, while we have had a very strong SFE social media presence that reaches many people across the country, event surveys continue to indicate that email is our most effective way for connecting with potential SFE program participants. Given these results, we will use social media in a more focused manner to provide information related to our events, programs, and products.

Increased opportunities have led to a different type of challenge (not necessarily unwanted). Over the last few years, as the result of wider recognition of SFE as a go-to partner in the region, we have been invited to participate in meetings, field workshops, and training opportunities by a variety of partners (and potential partners). These are obviously important opportunities to extend fire information to a broader stakeholder base than we currently have, but they also can lead to “mission creep”, keeping us from our unique region-wide role of unbiased science translation and application. We do not need to refine our mission, but are vigilant of slipping into areas of advocacy, (e.g. *de facto* promotion of prescribed fire acreage increases or restoration of longleaf pine) or other agendas. We have a well-defined niche, and we are broader in many ways than the specific organizations working in similar areas.

II. Governance

Overall SFE governance has been through a Leadership Team (LT, formerly called Steering Committee) composed of the PI or co-PI at each of our three lead institutions, a science/outreach specialist at the Southern Research Station (SRS) and the Administrative Director, along with five senior leaders from the Forest Service, National Park Service, Southern Group of State Foresters, Regional Forestry Extension and Interagency Prescribed Fire Training Center (PFTC). The rest of the SFE staff is integrated with the LT through monthly or bimonthly conference calls. The five external leaders provide key guidance for overall programming, while the SFE personnel on the LT provide detailed programming and planning. We recently added Joe O’Brien, a fire ecologist at the USFS SRS, to our LT to strengthen the SFE-SRS partnership.

SFE has also operated with a 22-member Advisory Board (AB) composed of at least one person (ideally two people) from each of 10 states, representing a variety of public agencies, NGOs and private organizations. Many members are also associated with their state PFC. The AB is formally requested to provide advice on priority topics and programming needs via email surveys or conference calls two or three times each year. Other suggestions from AB members are solicited or spontaneously offered

during discussions at meetings or through email/phone conversations. Two AB members made research highlight and SFE update presentations at their state PFC meetings over the last three years. Although some AB members have been extremely helpful, others have been less responsive. We believe it is an appropriate time to reduce the size of the AB to 11-12 members, with the same geographic representation, while being certain that each of those members is willing to be directly involved with the SFE staff in organizing and delivering programs.

SFE does not have a formal group of science advisors. However, all of our products (fact sheets, research highlights, webinars, etc.) utilize scientists involved in each topic, to review content, coauthor text, present webinars, and participate in workshops, assuring that our products are vetted with appropriate scientific experts.

SFE External Leadership Team

Dave Frederick	SGSF Fire Representative
Shardul Raval	USFS Region 8 Fire & Aviation Director
Bill Hubbard	Southern Regional Extension Forester
Greg Seamon	Prescribed Fire Training Center, TTRS
Caroline Noble	USFS Wildland Fire Management Research, Development, and Application

2014 Advisory Board

Name	State	Affiliation
Kent Hanby	AL	Consultant, PFC
John Stivers	AL	Consultant, PFC
Jason Milks	AR	The Nature Conservancy (TNC), PFC
McRee Anderson	AR	TNC
Doug Fletcher	AR	Arkansas Natural Heritage
Zach Prusak	FL	TNC, PFC
Bill Palmer	FL	Tall Timbers Research Station (TTRS)
Brett Williams	FL	Eglin Air Force Base
Mike Dueitt	FL	USFWS, PFTC
Mark Melvin	GA	Jones Center, PFCs
Neal Edmondson	GA	GA Forestry Commission, Prescribed fire program manager
Russ Walsh	MS	PFC
Scott Pohlman	NC	NC Dept Environment and Natural Resources, NC PFC chair
Susan Miller	NC	US FWS
John Weir	OK	Oklahoma State Univ faculty, PFC
Jack Waymire	OK	OK Dept Wildlife Conservation
Darryl Jones	SC	SC Forestry Commission - state fire chief
Mike Wetzel	SC	Consultant, Association of Consulting Foresters, PFC
Rich Gray	TX	TX Forest Service, Regional Fire Program Coordinator
Morgan Varner	VA	Virginia Tech University
Fred Turck	VA	VA Dept of Forestry, PFC
Keith Argow	VA	National Woodland Owners Association, Pres.

III. Logic Model

Customer's Expectations, Wants, and Priorities

Participants and stakeholders have regularly had opportunities to provide input regarding their preferences for SFE products and outputs. Consistently, they have indicated the importance of diverse products, reflecting the utility of different outputs for different people. Although travel is often limiting, they also indicate that face-to-face and experiential activities are a favorite venue for sharing new science information and applications. They also suggest a wide variety of issues, problems, and topics for which they want more information. The range of topics has been reasonably consistent for the last five years, and tends to sort into a small list of general categories. SFE programming over the last two years focused on the development of science translation products related to these specific categories such as smoke and fog issues, prescribed burning technology, fire regimes, and fire effects on wildlife, with the topic rotating every two to three months. However, through AB feedback, we have recognized limitations with focusing spotlights for short time periods when there are continuing interests and programmatic opportunities, over a longer term.

Thus, and with agreement from LT and AB members (and planning guidance from JFSP over the last year), we are transitioning our focus to four broad ongoing themes that encompass a large majority of the specific topics raised by our stakeholders:

1. *Smoke and Air Quality:* Smoke management and effects, including smoke and fog forecasting, air quality impacts, weather interactions with smoke;
2. *Prescribed Burning:* Improvements in incorporating science into burn prescription, implementation, and evaluation; including application of weather forecasting tools, fire behavior models, quantification of fuel loads and consumption, manipulating fire regimes, fire interactions with herbicides and fuel treatments;
3. *Fire Ecology:* Ecological effects of fire on individual species or communities of plants and animals, soil, water, and wetlands across temporal and spatial scales;
4. *Wildfire Mitigation & Suppression*: Research-based information related to suppression and fuels management impacts, safety guidelines and equipment, tactical decision making, resource-use fire, risk assessment and reduction, and WUI fire mitigation.

Although these four categories encompass most of the priorities expressed by stakeholders they are not all inclusive and SFE programming will address other topics as opportunities arise. For example, the Southeast Region Cohesive Strategy (CS) Action Plan has a substantial number of action steps related to science delivery, and well-renowned entities like the Tall Timbers Research Station are working to expand their fire outreach activities in cooperation with the SFE. Although SFE is directly mentioned in the original CS Action Plan for only two of the steps, we are working with the Regional leadership to have an active role in many of the relevant action steps.

Drivers of the Plan of Work

The primary driver in our logic model (LM) and plan of work (POW) is to meet the following four SFE mission goals for all stakeholders involved with, or interested in, fire management in the South:

1. *Increase/improve fire science access*
2. *Incorporate fire science into decision-making*
3. *Be impartial brokers of science information*
4. *Unite fire science and natural resource management*

As identified previously, we believe we have been particularly successful in addressing Goals 1 and 3 so far, and will maintain the same level of activities through FY18. We have significantly improved our focus

on Goals 2 and 4 in the last two years, and the new LM and POW include continuing and increasing ongoing activities for these goals, such as webinars, workshops, and several new methods for moving science information into applications.

The focus on Goals 2 and 4 will include activities in the states and with the agencies that have been part of our geographic challenge, using not only SFE personnel but AB members, partners and distance education media. As they have been in the past, partners will be especially important for increasing the number of field-oriented outputs. The Southeast Regional Partnership for Planning and Sustainability (SERPPAS) Prescribed Fire Working Group has been a valuable and productive partner, and we intend to continue that interaction with SFE providing science input whenever possible.

Towards meeting our fourth goal of uniting fire science with management, our POW will include a new strategy. We intend to develop ad-hoc 'Fire Circles' in different states around the region. We envision these as small groups of management, science, policy, and educational specialists working together to identify and address specific local fire-related problems and issues using up-to-date science and tools. The SFE will work closely with the AB for guiding the process of issue identification, and will be responsible for providing the science needed to enable the group to work together to find solutions to challenges, and aiding in the facilitation of the meetings and dissemination of products. Results from the Fire Circles will be catered towards the group's particular needs. Some examples include: the development of best management practice guidelines for prescribed burning or wildfire suppression in the region; creation of strategic plans; development of content to be incorporated into state and federal training programs; compendiums of materials to be used for partner outreach activities (train the trainer materials); and other appropriate outputs that help resolve the issue by incorporating science. The SFE will make the evaluation of existing science easier and more streamlined for the Fire Circle members, but will not engage in any advocacy-related products. We will act to coalesce, inform, and promote science-based problem-solving across our region by capitalizing on the proven effectiveness of face-to-face workshop scenarios.

The other major drivers of the POW are the four major themes identified in the previous section. Prescribed burning has always been a primary focus of SFE programming, specifically to emphasize the science and technology related to prescribed burning. The two other general themes – smoke and air quality and fire ecology – are especially relevant for prescribed burning. The fourth theme more specifically reflects our commitment to address the need of federal and state agencies for research-based information on wildfire suppression, prevention and mitigation.

Logic Model, Outputs and Outcomes

The general SFE LM (starting on the next page) was built on the FY15 LM and individual LMs that were drafted for each of the four general themes. In the FY15 LM we refocused Outputs to align with JFSP's communication categories, reworded and added new Outcomes, specific Situation items that address the four general themes, and External Factors that influence what SFE accomplishes but are beyond our control (next paragraph). Many of the Outputs and Outcomes in the general LM implicitly include more specific outputs and outcomes related to each of the four general themes. Activities (outputs) that support the Outcomes are described in the Plan of Work (starting on page 13) and Outcome Worksheet Tables (Appendix).

Southern Fire Exchange Logic Model FY16-18

Situation →	Inputs →	Outputs
		Activities
The SFE has unique mission of acting as an unbiased broker of fire science. Concerns about smoke effects and correct burn prescriptions are limiting factors on the amount of prescribed burning that is conducted. Wildfires are important in every state, especially in the wildland-urban interface (WUI). Existing or emerging fire science can help managers integrate science into management planning and meet objectives in the southern region. Fire and land managers seek answers for a variety of questions; many answers are available via past R & D, as well as in new research results. Many of these questions fall into four major themes: smoke effects and management, improving burn prescriptions to meet management objectives especially for restoration, ecological effects of fire, and wildfire mitigation and suppression. Fire managers have limited time to locate relevant fire information and research, and what they need may not be readily accessible. Widespread opportunities exist for integrating fire	JFSP funding SFE investigators & staff time Advisory Board & Leadership Team guidance/assistance Partnerships with variety of agencies and organizations (e.g., SERPPAS, PFCs, SGSF) Collaboration with other consortia, especially in adjoining states Existing and emerging science Existing bibliographic databases (e.g., TTRS fire ecology database (FED), FRAMES) and information sources (e.g., Encyclopedia of Southern Fire Science (ESFS), Fire Effects Information System (FEIS)) Existing information outlets (e.g., PFCs, SGSF, federal fire academies, SRS) Continual assessment through post-event surveys Resources for hosting website (NCSU, UGA, Squarespace) and webinars (NCSU, UF, FLLC, FRAMES archives)	**1. Awareness** Maintain and regularly update website as a first stop for wide variety of prescribed and wild fire information, resources, fire science software, and other tools and maps. Prepare *Fire Lines* newsletter with information about new publications, features and resources, links to new models or web-based tools, and upcoming webinars, workshops, events. Deliver presentations and develop publications that provide introductory information and updates. ● SFE overviews and updates ● Introduction to both existing and new resources or tools Answer specific questions for public education leaders. Update and expand the FED regularly. Maintain Friday Updates e-news. Provide regular flow of information through social media (Twitter, Facebook, LinkedIn) and promote use of LinkedIn fire science forum. **2. Understanding** Describe new research highlights and applications in presentations at PFC, SGSF and other meetings. Coordinate and archive new fire science webinars that translate relevant recent research. Prepare and distribute research briefs and fact sheets that summarize highlights and applications of new and existing research and other relevant information. ● *Fire Lines* bimonthly newsletter ● Fact sheets and technical reports Prepare short PowerPoint presentations or other media that AB members, public agency staff and others can use to present research highlights to audiences that SFE cannot reach directly. Provide revisions for ESFS sections on fire ecology, prescribed burning and smoke management based on new/recent research and information. Contribute to discussion & ask an expert forum through LinkedIn Fire Science group.

science into management planning, both short and long range. Prescribed Fire Councils (PFCs) meet annually or biannually in most states—providing an excellent opportunity for science delivery to managers. Many programs, agencies, institutions, & partnerships in the region are already involved with fire science, trainings, & information transfer to landowners and fire managers. Both fire research and management communities request improved 2-way communication. Public education about prescribed fire and wildfire prevention is conducted by variety of agencies throughout the region. The Southeast Regional Cohesive Strategy Action Plan includes elements involving technology transfer that are consistent with the SFE mission.		Serve on Steering and Program Committees for regional and national conferences, such as the AFE International Fire Congress in San Antonio in 2015 and in Florida in 2017. Collaborate with important partner efforts (Cohesive Strategy, SERPPAS, SGSF Committees) to enhance fire science applications and use. **3. Learning & Application** Develop and deliver modules on fire science applications at field days, workshops, & trainings hosted by SFE and partners. Assist partners in coordination of similar learning events and product development. Coordinate workshops, field tours and other trainings involving researchers/specialists meeting with fire managers, landowners and/or firefighters. Organize, lead, and provide appropriate scientific information for state-specific "Fire Circles" to address science applications for stakeholder defined critical issues. **4. Partnerships** Meet periodically with key decision makers to update them on new science applications and promote opportunities for getting science on the ground within their organizations. Expand interaction with AB members and involve them in SFE activities in their states. Build relationships with existing and new partners by working on solving user-defined challenges through face-to-face interactions (e.g. Fire Circles, workshops) and by serving on appropriate steering committees.

Outputs	→ Outcomes		
Participants	**Knowledge Gains (Short-term)**	**Attitude/Behavior Changes (Medium-term)**	**System-wide Improvements (Long-term)**
Southeast region (AL, AR, FL, GA, LA, MS, NC, OK, SC, TX, VA) Managers, firefighters, technicians, or specialists involved in fire management activities Public: federal, state, & local agencies Private: NGOs, consultants, & landowners Fire experts or researchers from agencies, universities, NGOs, private groups Prescribed Fire Councils in SE states Tech transfer specialists with NGOs, agencies College and university students interested in wildland fire science Public education specialists/officers K-12 & higher education providers Public: residents of WUI & rural areas, policy makers	Increased awareness of SFE and other fire science resources and activities. Participants in SFE events and presentations increase their understanding of ecological effects of fire, Rx burn prescriptions, smoke management & air quality. Resource managers and firefighters receive new science-based information about wildfire mitigation & management techniques, impacts & safety. Managers increase their understanding of potential applications of research information they receive. Research community increases awareness of opportunities to translate and disseminate current research results and scientific information. Increased feedback from end users regarding new fire science research needs. Public education specialists increase awareness of SFE resources they can use.	Increased access of fire science research and SFE resources. Managers and practitioners incorporate new resources & information related to ecological effects, burn prescriptions and smoke management in their fire-related work. Firefighters and fire suppression activities demonstrate increased use of research-based wildfire mitigation & management techniques and impacts. Fire science information is regularly disseminated through PFC meetings, agency training academies, and webinars. SFE activities increase information exchanges between scientists and land managers. Scientists increase translation of new research and technologies into resources that can be used and applied by firefighters and managers. Research community increases support for, and initiation of, research requested by end users. Public education specialists increase use of SFE fire science resources.	**SFE Long Term Goals** Managers actively use research results in decision making, planning and implementation. Land managers increase the number of science-based acres burned in the South; quality of prescribed burning increases as science and tools align prescriptions with implementation & meeting ecological objectives. Firefighters increase use of suppression techniques that reduce ecological impacts. Fire science research is designed and funded to meet regionally identified management priorities. **Regional Goals (broader than SFE)** Ecosystems in the South are appropriately managed using the best available science based on the specific management objectives for each site. Fire risks are mitigated across the region, especially in WUI (fewer escapes & traffic accidents, reduced air quality issues associated with burns). Demonstrable decrease in average injuries and fatalities related to fire management in the South. Public support increases for prescribed fire as a management practice based on science.

External factors that impact logic model

- Policies and economic conditions that limit fire science training, continuing education, and fire use/ management.
- Changing government regulations, as in smoke management and air quality standards.
- Predispositions and notions of people relative to science and its application.
- Applicability of existing fire behavior tools and models to southern ecosystems (demonstrating relevance).
- Population growth and expansion of the WUI.
- Public sentiment and attitude about prescribed fire (especially newcomers to the South).

IV. Future Direction

To maximize our impact across the region, we will increase our collaboration with existing partners (i.e. PFCs, SERPPAS, The Longleaf Alliance, The Nature Conservancy, Cohesive Strategy and others) and cultivate relationships with new partners (i.e. USFS Climate Hubs, Fire Adapted Communities Learning Network, the National Wild Turkey Federation and others). We've documented from our stakeholders interest in improved access to fire science information related to climate change, WUI issues, and game management and our plans to develop partnerships with these organizations may help to meet mutual organizational objectives. Following the recommendations of our LT and AB, we will continue to provide and integrate our program resources with state certified burn program curricula. SFE resources are already promoted during the Alabama prescribed burner certification and re-certification courses and we're committed to expanding this to new states within the region. Similarly, to reduce participant costs associated with access to formal fire science training, we will continue to encourage efforts to develop online open-access fire science courses.

With the input of our LT and AB, and based on survey feedback from end-users, the POW outlined in the Planned Activity Tables below will improve stakeholder access to fire science information related to our four broad programmatic themes. The planned activities that have been selected will connect topic-based resources that span the learning spectrum: from website resources and publications, to webinars and presentations, to workshops/field tours and collaborative meetings (Fire Circles). For the stakeholders that follow along, these resources provide a layering approach for learning about new and existing fire science. For others, this approach offers the opportunity to choose their fire science educational resource type *á la carte* based on their time, travel constraints, and preferred learning styles. While publications and webinars are accessible resources regardless of geography, field events, meetings, and workshops tend to be localized events that draw from only a few hundred mile radius. To ensure that we are growing our program as a fire science resource across the South, we have strategically scattered our field events, workshops, and Fire Circles across the region so that we're meeting *local* fire science needs and establishing connections among local managers and researchers. Some of the proposed activities will continue to take place in the states where our staff and leadership are located. This is in part because of our extensive personal contacts within those areas and the accompanying low cost of travel to implement programming. To offset some of the travel costs associated with program delivery across the region, we plan to have our AB members represent the SFE at their local PFC and other key organization meetings when opportunities exist.

The following SFE POW provides details on the activities and events on which the SFE will be investing staff time and resources from late FY2015 through FY2018 (federal FY). This POW is a minimum listing of activities; others may be added as new opportunities arise or are requested. Theme-specific products and events are listed chronologically in the top four tables. The last table is a set of ongoing activities and presentations that occur on a regular schedule throughout the years.

Ending FY 2015 Planned Activity Table

Activity	QTR/FY	Comment	Comm. Phase	Theme
Publication	Q4/2015	Invasive Plant Responses	Understanding	Fire Eco
Publication	Q4/2015	Fire and Privet	Understanding	Fire Eco
Webinar	Q4/2015	Fire and Privet	Understanding	Fire Eco
Field Tour	Q4/2015	TNC Disney Preserve (FL)	Learning	Fire Eco
Publication	Q4/2015	Fuel Consumption Models	Understanding	RxFire
Webinar	Q4/2015	FOFEM in the SE	Understanding	RxFire

FY 2016 Planned Activity Table

Activity	QTR/FY	Comment	Comm. Phase	Theme
Workshop	Q1/2016	AFE Fire Congress (TX)	Learning	RxFire
Presentation	Q1/2016	SAF Conference (LA)	Understanding	na
Publication	Q1/2016	Seasonal Effects of RxFire	Understanding	RxFire
Webinar	Q1/2016	Seasonal Effects of RxFire	Understanding	RxFire
Publication	Q2/2016	New Info Relevant to CS Topic TBD	Understanding	Wildfire
Publication	Q2/2016	SE Smoke Models	Understanding	Smoke/AQ
Webinar	Q2/2016	Smoke Models for the SE	Understanding	Smoke/AQ
Workshop	Q2/2016	Smoke Models (NC)	Learning	Smoke/AQ
Publication	Q3/2016	Duff Heating Pine Mort.	Understanding	Fire Eco
Webinar	Q3/2016	Duff Heating Pine Mort.	Understanding	Fire Eco
Workshop	Q3/2016	Duff Research Ordway (FL)	Learning	Fire Eco
Publication	Q3/2016	Safety Zone Science	Understanding	Wildfire
Webinar	Q3/2016	Safety Zone Science	Understanding	Wildfire
Fire Circle	Q3/2016	GA Stakeholder Workshop	Learning	TBD

FY 2017 Planned Activity Table

Activity	QTR/FY	Comment	Comm. Phase	Theme
Publication	Q1/2017	Intro Fuels Photo Series	Understanding	RxFire
Webinar	Q1/2017	Intro Fuels Photo Series	Understanding	Fire Eco
Workshop	Q1/2017	Photo Series Demo (AL)	Learning	Fire Eco
Fact Sheet	Q1/2017	Benefits of Modern Firewise Landscaping	Understanding	Wildfire
Publication	Q2/2017	Herbicide and Longleaf	Understanding	RxFire
Webinar	Q2/2017	Herbicide and Longleaf	Understanding	RxFire
Workshop	Q2/2017	Escambia Exp. Forest (AL)	Learning	RxFire
Fire Circle	Q3/2017	VA Stakeholder Workshop	Learning	TBD
Publication	Q3/2017	Longleaf Pine Management	Understanding	Fire Eco

Webinar	Q3/2017	Longleaf Pine Management	Understanding	Fire Eco
Workshop	Q3/2017	Fort Stewart Longleaf (GA)	Learning	Fire Eco
Publication	Q4/2017	Smoke Modeling Tools	Understanding	Smoke/AQ
Webinar	Q4/2017	Smoke Modeling Tools	Understanding	Smoke/AQ
Fire Circle	Q4/2017	MS Stakeholder Workshop	Learning	TBD
Publication	Q4/2017	Science synthesis for CS; topic TBD	Understanding	Wildfire

FY 2018 Planned Activity Table

Activity	QTR/FY	Comment	Comm. Phase	Theme
Presentation	Q1/2018	AFE Fire Congress (FL)	Understanding	Fire Eco
Workshop	Q1/2018	AFE Fire Congress (FL)	Learning	RxFire
Publication	Q1/2018	Stoddard Fire Plots	Understanding	Fire Eco
Webinar	Q1/2018	Stoddard Fire Plots	Understanding	Fire Eco
Workshop	Q1/2018	Tall Timbers Fire Plots (FL)	Learning	Fire Eco
Publication	Q2/2018	Loblolly Pine RxFire	Understanding	RxFire
Fire Circle	Q2/2018	LA Stakeholder Workshop	Learning	TBD
Webinar	Q2/2018	Loblolly Pine RxFire	Understanding	RxFire
Workshop	Q2/2018	Santee Exp. Forest (SC)	Learning	RxFire
Publication	Q3/2018	Science synthesis for CS; topic TBD	Understanding	Wildfire
Publication	Q3/2018	Shortleaf Pine Mgt.	Understanding	Fire Eco
Webinar	Q3/2018	Shortleaf Pine Mgt.	Understanding	Fire Eco
Publication	Q4/2018	Smoke Mgt in the WUI	Understanding	Smoke/AQ
Webinar	Q4/2018	Smoke Mgt in the WUI	Understanding	Smoke/AQ
Fire Circle	Q4/2018	OK Stakeholder Workshop. Joint meeting with Oak Fire Science Consortium	Learning	TBD

Annual Activities

Activity	QTR/FY	Comment	Comm. Phase	Theme
Presentation	Q2/16-18	SGSF Winter Mtg (TBD)	Key Contacts	TBD
Presentation	Q2/16-18	N Florida PFC Spring (FL)	Understanding	RxFire
Workshop	Q2/16-18	NRCS Fire Ecology (FL)	Learning	Fire Eco
Presentation	Q2/16-18	Louisiana PFC (LA)	Understanding	RxFire
Presentation	Q3/15-18	SGSF Summer Mtg (TBD)	Key Contacts	TBD
Meeting	Q3/15-18	All Consortia Meeting (TBD)	Administrative	na
Meeting	Q3/15-18	SFE annual planning (TBD)	Administrative	na
Presentation	Q4/15-18	North Carolina PFC (NC)	Understanding	RxFire
Presentation	Q4/15-18	Alabama PFC (AL)	Understanding	RxFire
Presentation	Q4/15-18	Georgia PFC (GA)	Understanding	RxFire

Presentation	Q4/15-18	South Carolina PFC (SC)	Understanding	RxFire
Presentation	Q4/15-18	Central Florida PFC (FL)	Understanding	RxFire
Presentation	Q4/15-18	N Florida PFC Fall (FL)	Understanding	RxFire
Presentation	Q4/15-18	South Florida PFC (FL)	Understanding	RxFire
Training	Various	Assistance with NWCG and state Burn Manager courses; include SFE info	Understanding Awareness	All Topics
Training	Various	Online Fire Science course	Understanding	All Topics
TBD	Various	Outreach activities related to JFSP-funded regional research, as described in letters of support	Learning and Understanding	All Topics
Fire Ecology Database	Weekly	Add new citations to FED	Understanding	All Topics
Website	Daily	SFE Website Updates	Understanding	All Topics
Newsletter	Bi-Monthly	SFE Fire Lines Newsletter	Understanding	All Topics
Social Media	Weekly	To promote programs	Awareness	All Topics
YouTube	Monthly	To archive webinars	Understanding	All Topics

*SGSF: Southern Group of State Foresters, PFC: Prescribed Fire Council, FED: Tall Timbers Fire Ecology Database, CS: National Cohesive Wildland Fire Strategy